Introduction

The Truman residence was constructed over a period of years with numerous additions and revisions to the initial structure. This staged construction is reflected in the various configurations of the structural system throughout the building. The residence is of wood frame construction supported by a stone foundation with framing materials and systems varying in size and detailing depending on the period of construction. Variations in ceiling height due to the popular style at the time of an addition created unusual detailing within the structure in order to achieve a uniform exterior appearance. This is particularly evident within the attic space, where roof and wall framing reflect such detailing. ¹

Architecture and Engineering Team

Architectural investigation and analysis was performed by the staff of Restoration Associates under the direction of E. Eugene Young, AIA. Structural investigation and analysis were performed by the staff of Harper and Kerr Consulting Structural Engineers, P.A., under the direction of Gary Harper. Plumbing and heating, ventilating and cooling system investigation and analysis were performed by the staff of Associated Engineering Consultants under the direction of Tony Hitchcock.

The Architect/Engineer team conducted a detailed field investigation of the Truman home in connection with the field measurement process. The areas investigated included the structural systems, and the heating, ventilating and cooling systems. Specifically excluded from the investigation were site utilities, and the electrical and communication systems.

Recording and analysis of the condition of architectural features are not a part of this report but are noted on the Existing Condition

Drawings. This report analyzes the results of the field investigations, describes the current capacities of each system, and identifies serious deficiencies. Recommendations for structural reinforcement of the porches were made at the site by Gary Harper (Harper and Kerr), Gene Young (Restoration Associates) and members of the National Park Service, so that the work could be done prior to opening the house to the general public on May 12, 1984.

Scope of National Park Service Work

During the investigation and analysis of the house, the National Park
Service performed various segments of repair work (from 1984-1986)
either with their staff or independent contractors. The contract
documents for this work were prepared by National Park Service staff.
The following is an outline of the scope of National Park Service work:

A. Replacement of the entire electrical system by an electrical contractor. Most of the historic electrical system was left

in place and disconnected, for preservation purposes. Recording of the existing and new electrical system was done by the National Park Service.

- B. Replacement of the metal roofing, flashing, gutters and downspouts by a sheet metal contractor.
- C. Reinforcement of the wood porches and first floor structural members from the basement was accomplished by National Park Service staff utilizing recommendations of the Architect/Engineer team.
- D. Repair of deteriorated exterior wood trim and decorations was completed by a single contractor in November, 1985.
- E. Field investigation was completed in 1984 by National Park Service staff in preparation for paint stripping and repainting.⁴

Building Description and Analysis

The asymmetrical, two-and-one-half story, white clapboard structure is a Victorian, Queen Anne landmark. It can be further classified as a spindlework Queen Anne with hipped roof and lower cross gables.

The principal portion of the Truman home is topped by a metal-decked, dentiled "widow's walk" and four gabled dormers fitted with jalousie windows. The trim of the projecting eaves of the main roof features a molded fascia and decorative frieze work adorned with heavily ornamented wooden brackets set directly above the second floor window jamb trim and

corner trim. One-over-one, double-hung windows are predominant.

The prominent west facade is marked by a two-story bay window featuring multipaned colored glass set in wood muntined double hung windows. The bay window is capped by a bell cast sheet metal clad roof with projecting eaves. A multipaned colored glass casement window with a pedimented hood is set within wing walls formed from the bay window roof. A gabled roof with decorative verge boards extends over and above the bay roof. A similarly detailed gabled roof also exists at the south elevation.

From the west bay window a veranda stretches north, then curves east and continues to a two-story north bay window which is characterized by a saw-toothed, horseshoe-shaped ornament set within the plain fascia of the bay window's gable roof. This highly ornamented veranda features a mansard parapet, jigsaw frieze boards, four types of brackets and perpendicular lattice skirts. A second, two-bay porch of the same characteristics, but without a parapet, protects the south entry into the living room. (See Figs. 2.1-2.4.)

The main or west entry into the house is situated just north of the west bay window of the 1885 addition. The double-leaf, nine-foot tall doors feature Eastlake style detailing with etched glass panes. The entry leads to a small ceramic tile floored vestibule bay and finally to another set of Eastlakian enriched doors. These doors open to a central

hall (103) which is adorned with Lincrusta-Walton wainscoting. The primary double-landed, U-shaped stairway at the south wall of the central hall features Lincrusta-Walton along its rake, a highly ornamented wooden baluster, and a newel post capped by a feminine luminiare.

<u>Landscape</u> (For site conditions, see Fig. 2.5.)

Topography

The site of the Truman home slopes gently eastward toward the rear of the structure, from a relatively flat ground at the property's western half. The site slopes approximately 5 percent, falling nine feet from west to east.

Vegetation

The Truman home property contains several species of trees including nine maple (west, north, south of structure); two oak (south of structure); and three Siberian elm (south of structure).

The maple located at the southwest corner of the property, branching over into the alley, is devoid of foliage and branches on the east side except at the crown. Leaves on the west side exhibit small holes and ragged edges. Leaves are wilted, i.e. edges of leaves curl down. The maple directly south of the concrete walk to the main entrance of the Truman home has only one lower branch with foliage remaining (west side

of trunk), in addition to a stub of a limb that has snapped off three to four feet from the trunk. Foliage exhibits good color and appears healthy.

The maple directly north of the walk has a lower branch on the east side which has lost foliage and bark from outer three to five feet. Otherwise, the tree has full shape and foliage exhibits good color and appears healthy. Located south of the historical marker (HS-11), another maple is not as tall or as fully shaped as the other maples lining the west property line.

In addition, there is an assortment of informally planted shrubs and bushes located along the south property line near the alley, along the main elevation of the Truman home and to the north of the rear porch. Peony beds, irises, roses and ornamental grasses appear throughout the lawn with a high concentration of plantings at the eastern edge.

Walkways and Driveways

There are two concrete walks on the Truman property: one leading from the Delaware Street sidewalk to the main entrance and one that leads from the rear drive winding around the south elevation of the structure, finally connecting back to the west walkway. Although the location of the walks is historic, the sidewalk material is not, except for a rear sidewalk extending from kitchen porch steps to the driveway.

An alley on the south end of the property line has been repaved a number of times because of the substandard base of the roadbed. In addition, there is a second asphalt drive on the east end of the property off of Truman Road. Both drives lead to the Carriage house and join at its eastern elevation.

Fences

A five foot high, steel fence (HS-03), including a driveway gate at the northeast corner, fully encloses three sides and partially encloses the east edge of the Truman property. This black painted fence constructed of stock steel tube and bar and set in concrete footings, was erected in November 1949 at the insistence of the Secret Service to protect the Truman property from potential intruders and souvenir hunters. In addition, there is a portion of a chain link gate fence located at the southwest corner of the Carriage house, probably a portion of a gate which spanned the drive between the Carriage house and Wallace garage.

Four pedestrian gates exist at the Carriage house, the west entry, and two at the Wallace home which is to the east of the Truman home. The double-leafed driveway gate and pedestrian gate are inset from the sidewalk with curved fence sections. Both the driveway and west main entry gate locks can be operated electronically from inside the home.

Miscellaneous Structures and Archeological Remains

A thirty-four foot flagpole (HS-08) was installed June 26, 1945 near the

northwest corner of the site. 6 In addition, there are four concrete slabs: two (used for a/c units) at the north end of the Truman home, installed by the National Park Service in 1985, another at the northeast driveway gate and a fourth located to the northeast of the Carriage house. A gas lamp (HS-09); sundial (HS-07); a birdbath (HS-05); and a historical marker (HS-11) are also located on the property.

The remains of historic structures include: the stone and brick foundation of the pergola (HS-04) located at the northeast portion of the property; the site of the Secret Service security booth (HS-06) located west of the Carriage house. A concrete capped cistern (HS-10), installed in 1885 (located under porch 113A), was sealed in 1926. A triangular concrete foundation (HS-12) in the east yard is suspected to have been a flagpole base.

Environmental Considerations

The following, obtained from the National Weather Center in Kansas City, Missouri, are averages for the Kansas City Metropolitan area taken over a 30-year period (1955-1985).

Heating Days (based on 65°) = 5,283 Cooling Days (based on 65°) = 1,333 Average Yearly Rainfall = 35.16 inches Average Snowfall = 20.4 inches Humidity = high morning 80% daytime 60%

late afternoon 60%

Wind = 10.7 mph

Underground Utilities

On-site underground utilities include a buried electrical line for the west gate latch (south of walkway to rain entrance); a buried South-western Bell telephone line running southeast from the south elevation of the Truman home installed 1985; buried power and security lines (east-southeast from the Truman home to the Carriage house, 1985); and a buried Independence Power and Light line running due north from the kitchen wing (113) 1985.

A 2 inch steel gas main is located on the south side of Truman Road, running west from Delaware Street to the Secret Service booth site. There are buried telephone cables, conduit and fiberoptic cables within the Truman Road right of way. In addition, there are two 8 inch sanitary sewers: one runs north within North Delaware Street to Truman Road and another runs east and west within the alley. Storm sewer lines are within the Truman Road right of way.

Foundation

The residence is supported by a random-course limestone foundation, the limestone being similar in color and texture to that common to the area. The foundation wall averages approximately eighteen inches in thickness, and the stone and mortar of the foundation wall are basically sound.

However, the interior face of the foundation is powdery to the touch, indicating deterioration due to moisture penetration from the exterior or rising dampness. The foundation walls show a minimum of differential movement and are relatively crack free. Within the original stone work the only major cracks noted were in the south basement room (005), under the living room (104) on both sides of the brick fireplace. One crack west of the fireplace runs diagonally from the upper part of the wall, extending downward approximately three feet following the mortar joints. The crack averages approximately one-quarter inch in width. The widest part of the crack is approximately one-half inch in width and is the result of displaced mortar rather than wall movement.

The second crack in the south room is immediately below the window east of the fireplace. This crack again is more the result of missing mortar than wall movement. The brick foundation under the main fireplace of the living room (104) and master bedroom (204) is very soft, with the surface crumbling to the touch. The mortar is powdery and the whole assembly shows significant evidence of exfoliation. The brick does, however, resist probing beyond the immediate surface.

Numerous small cracks were noted in the plaster finish applied to the stone wall within the remodeled utility area (002), below the kitchen. These cracks were found on the south and east wall of the utility area, generally running from the corners of the windows within this area. The lower portion of the firebox on the east wall of the room has lost the

lower eighteen inches of plaster exposing the brick. This brick is relatively soft to the touch and crumbles upon contact.⁷

First Floor Framing and Condition

The kitchen (113) is thought to be within the original 1867 structure. The basement area under the kitchen (002), having been remodeled as a laundry room (002) in 1954 and also having been reconstructed at the east end due to fire damage (occurring sometime between 1885-1900), reveals a variety of structural detailing. During the remodeling of the utility area, as noted previously, the perimeter walls were plastered. This plaster continues up between the floor joists covering a layer of brick laid on the original stone foundation between the joists. This detail hides the connection between the floor joist and the perimeter beam, so that the nature of this original connection can only be speculated upon.

Based on the structural system found in the north basement room (003) west of the laundry room (002) and on information gained during recent electrical modifications, it has been surmised that this area of the basement is framed with a perimeter 5×8 oak beam directly on the stone foundation.

The oak floor joists of the kitchen (113) and pantry areas (111, 112) are notched into pockets chiseled out of the south and north perimeter beams.

At approximately the western limits of the stairway leading from the kitchen to the basement, evidence of a fire can be noted by an original floor joist that has been burned completely through at approximately mid-span. This fire-damaged joist has been reinforced by the addition of a newer joist installed adjacent to the east face of the charred member. To the east of this reinforced joist, all floor joists appear to have been replaced.

The floor of the kitchen and pantry areas is framed using 2 x 8 oak floor joists, only a few of which are laterally braced by 1 \times 3 diagonal bridging at mid-span. The newer joists, previously mentioned, are toenailed into a double 2 x 8 header at the stairwell. This header is supported on the west end through a nailed connection by a single 2 x 8 joist spanning the room. Due to this connection and the bending stress placed on the supporting floor joist, the kitchen floor is limited to an estimated working load capacity of approximately 14 pounds per square foot, considerably below the common building code requirements of 40 pounds per square foot for residential construction. A column at the point of intersection of the header and floor joist now accepts the load from the stairway header and increases the allowable live load of this area of the kitchen to approximately 38 pounds per square foot, still below most standard building code requirements. West of this stairwell, the kitchen floor is capable of carrying a live load of approximately 52 pounds per square foot.

The floor of the dining area (110) has been strengthened with the addition (c. 1940s-1950s) of a 6 inch steel I-beam at approximately mid-span of the floor joists. (See Existing Condition Drawings, No. 9, First Floor Framing Plan.) This steel beam has helped the loading capability within the southern section of the room; however, the controlling factor for resisting loading is the reduced shear capacity of the floor joists due to the notched bearing ends. They are set into pockets cut into both sides of the central wood beam. (See Existing Condition Drawings, No. 31, Framing Details, Detail 10.) Two square wood posts at the western end and the recent installation (by the National Park Service in 1984) of two steel pipe columns, 2-1/2 inch in diameter, at the eastern end support the wood beam at intermediate points. The resultant reduction in span compensates for the diminished load capability of the double notched beam over its original longer span. The dining room extends to the south (over basement room 007) beyond the stone foundation wall which designates the southern limits of the framing distinguished by the 5×8 wood beams. This portion of the room is framed using a system similar in most of the southern section of the basement which will be discussed later in this report. The critical detail of this room, however, is not the typical detail but the connection of the floor joists supporting this portion of the dining room to the perimeter 5×8 wood beam of the northern area. This connection is made by notching the 2×8 floor joists to a three inch dimension and setting this notched end into a pocket cut in a 2 x 6 member nailed to the southern face of the perimeter 5 x 8 wood beam (See Existing

Condition Drawings, No. 31, Framing Details, Detail 5.) Several joists have, over time and loading, begun to split at this connection. At some point 1 x 6 tongue and groove boards of various lengths were attached vertically to one or both sides of these joists supposedly to strengthen the joists against the possibility of splitting. The reduced shear capacity of this connection limits the floor in this area of the dining room to a live loading of approximately 22 pounds per square foot, just over half the commonly accepted residential code requirements. Modification of the connection detail would increase the loading capacity of this area in excess of the capacity of the remainder of the dining room (approximately 100 pounds per square foot depending upon exact mcdification).

The floor of the parlor/music room (108) has also been strengthened by the addition of a 6 inch steel I-beam at approximately mid-span of the original wood floor joists. The music room and the northern one-half of the first floor central hall are connected by a wood beam having the typical connection detail of the northern basement area (notched joists sitting in pockets chiseled out of the original 5 x 8 wood beam). The wood beam in this circumstance, however, has been strengthened by the addition of a 2 x 8 member attached to the underside of the beam at one span and by additional wood columns which have reduced the maximum clear span to approximately four feet. Due to these modifications, the music room is capable of carrying a maximum live load of approximately 107 pounds per square foot.

The central hall (103) of the residence, like the dining room east of it, spans either side of the stone foundation wall separating the north and south basement areas. Constructed at two different periods, the framing system is not continuous, causing the junction of two systems of framing details to be in effect. The south basement area has a perimeter beam construction detail different from the north. The south room perimeter framing is distinguished by 6 x 6 wood beams sitting on a 2 x 8 member which in turn sits on a 1 x 10 bearing directly on the stone foundation. The bottoms of the floor joists are notched three times to clear, respectively, the foundation, the 2 x 8, and then interlocks into a pocket cut into the perimeter 6 x 6 beam. At the point of juncture with the south wall of the northern basement area where the 5 x 8 wood beam is located, this same notched joist detail is in evidence, but the connection to the beam is through a system of 2×4 's and 2×6 's nailed to the southern face of the 5×8 beam. central hall floor, due to the limited shear value of this connection of the joist supporting the southern portion of this room and the original 5 x 8 beam, has a maximum live load capability of approximately 28 pounds per square foot. That part of the central hall (103) situated over the northern basement area (004) has loading capabilities similar to the music room -- approximately 110 pounds per square foot.

The floor of the living room (104) is another area of the residence that has been modified with the addition of a 6 inch steel I-beam at approximately mid-span of the floor joists. The maximum allowable live load of

this room is approximately 113 pounds per square foot. An additional structural item, the wood beam supporting the eastern wall of the living room, has failed, which has minimal effect on the loading of the living room but which has major consequences to the second floor's load supporting capabilities. This beam exhibits extensive damage due to splitting at the northern notched connection. This beam carries, via transferal from the above wall, the load from the second floor central hall and thus is of significant structural importance. The wood floor joist immediately east of this beam has also split, most likely due to the transference of load through the floor decking upon failure of the beam. The split floor joist was temporarily shored by a wood column wedged between the floor joist and stones stacked on the basement floor. It is understood that this temporary support was placed by members of the National Park Service to prevent additional damage just prior to the on-site measurements and observations made for this report. In 1984 adjustable steel posts replaced the wooden post.

The floor of the downstairs bedroom, the Gates' bedroom (105) just east of the living room, is structurally composed of wooden joists pocketed into the perimeter wooden sill beams and was determined to have a live load capability of approximately 51 pounds per square foot. The bath adjacent to this bedroom (106) is of a newer construction and due to the relatively short clear span, was found to have a live load of over twice that of the bedroom, a load calculated to be approximately 120 pounds per square foot. 8

First Floor General Condition

An investigation of portions of the first floor walls indicates that the studs are approximately 16 inches on center, 9 although no physical verification of this was made. Walls and ceilings of the first floor area are generally in good shape showing little distress or movement.

The kitchen area (113) showed slight evidence of cracks over doors and windows in the south and west walls. At these points the wallpaper has separated, indicating a hairline crack. In numerous areas plaster seems to have spalled under the wallpaper or the paper was originally applied over loose areas. Some minor hairline cracking was noted at the ceiling.

The dining room (110) had very few visible cracks, the most obvious of which was one on the south wall just east of the bay window extension. This crack runs vertically parallel to the face of the jog forming the bay and approximately 1/2 inch from the impression of a panel of sheet rock, applied prior to the installation of the last wallpaper project, c. 1954, that has now pulled away from the wall. The north wall of the dining room has a slight bulge, approximately the height of the doorway opening into the library and approximately 2 feet east of that doorway. The ceiling of this room shows some distress under the paper but no evidence appears on the surface.

No major distress was noted within the library (109). The walls of this

room are virtually covered by bookshelves, thus making it difficult to assess structural conditions behind the shelves. There is a discoloration in the paper on the ceiling with a small hairline crack running the length of the discoloration. The limits of the stained area were approximately 12×36 inches with the crack running lengthwise.

The parlor/music room (108) showed evidence of water damage in the extreme upper northwest corner, extending approximately 12 inches each way from the wall intersection. Several wallpaper seams had opened up along the western wall, probably due to moisture or temperature differential. There is a ceiling crack near the south corner of the room. There is no sign of cracking under the major openings.

The living room (104) showed minor cracking on the north wall, being most obvious at the eastern trim of the north window of the front bay assembly, then wrapping northerly around the corner. Three other cracks in the same area extend from the baseboard diagonally upwards across the wall at approximately 16 inch centers. The east wall of the living room has two small horizontal hairline cracks, centered approximately between the doorway into the central hall and the doorway to the Gates' bedroom. The southern wall of the living room has a small crack that runs from the upper western corner of the trim surrounding the doorway to the south porch and arches across the wall to a point at the eastern face of the fireplace, approximately level with the point of origin. The crack then continues down the inside corner of the intersection of the fire-

place and the outer wall to the baseboard. A similar crack is found on the western face of this fireplace, running up the inside face of the intersection of the fireplace and the outside wall, crossing the south wall at approximately the upper one-third point of the existing window trim. Another small crack begins at the upper corner of this window trim and runs to the ceiling. The plaster and paper in this area have spalled indicating probable moisture penetration. A hairline crack was noted on the west face of the wall just south of the bay window, running up from the lower inside wall corner to a point approximately two-thirds of the way up on adjacent window frame. This crack then continues around the corner to said window frame. The ceiling of this room has a small crack located in front of the fireplace running approximately parallel to it. Some additional signs of stress show under the ceiling paper.

The Gates' bedroom (105) and bath (106) are in good condition with virtually no evidence of cracks. The bath, however, does have considerable moisture damage in the southeast corner and on the east wall due to water previously leaking through the ceiling from the floor of the sleeping porch (206) above. Storm windows were installed in 1985 behind the sleeping porch screens (206) to prevent water from infiltrating the porch deck and bathroom ceiling.

The foyer (102) appears to be in good condition. This condition is somewhat surprising considering the partial failure of the beam and

joist below this area. Some movement is evident in the wallpaper along the east wall and evidence is found in the ceiling plaster of what appears to be old cracks that have been painted over. The vestibule (101) just west of the central hall has considerable damage in the wall and ceiling plaster, probably due to the wide variations in temperature in this essentially unheated area.¹⁰

Porches

Four wooden porches are found at the five first floor doorways to the residence. (See Existing Condition Drawings, No. 5, First Floor Plan.)

The kitchen, or rear porch, designated 114A, B, and C, was constructed in phases. Porch (114-A) has a concrete capped stone cistern (HS-10) under it and adjacent to the stairway. The wood joists of the porch have been historically shored by 2 x 4 and 4 x 4 supports wedged between these joists and the cistern, or in some cases between the joists and the soil under the porch. These make-shift supports were not considered as a permanent part of the framing system for the analysis of the load carrying capability of these porches.

The southern portion of this porch (114A), being that portion having additional supports as described above and lying along the south wall of the kitchen, has surface deterioration due to salt and moisture decay. The eastern portion of the same porch, lying east of the east wall of the kitchen, appears to have been constructed in at least two phases.

The initial phase, 114B, is approximately 6 feet in width and was constructed using 2 x 8 timber members having an actual dimension of 1-7/8 inches by 7-3/4 inches. The eastern addition to this area of the porch (114C) has 2 x 8 members with an actual dimension of 1-1/2 inches by 7-1/4 inches. That portion of the porch east of the east kitchen wall is supported on brick piers approximately 12 inches square. The kitchen porch is constructed in such a manner that virtually all connections are toenailed. The weaker section of the kitchen porch (114A), that portion lying south of the kitchen, is weaker due to the inability of these toenail connections to adequately transfer the shear loading of the joists and an intermediate member to the foundation. This section of the porch should not be subjected to a live load of over approximately 5 pounds per square foot. Modifications at the connection points of the joists and intermediate structural members that would allow each structural member to carry a load equal to the full bending capability of the member, would increase the allowable live load capability of this porch to approximately 34 pounds per square foot. Additional strengthening can be accomplished by modifying the temporary supports now in place at joist mid-span to permanent structural members. The other sections of the porch have slightly different loading capacities.

Porch area 114B is calculated at a live load limit of approximately 36 pounds per square foot and area 114C at approximately 42 pounds per square foot.

The small porch (107A) servicing the eastern doorway to the first floor central hall (107A) has a double floor comprised of 2-1/4 inch tongue and groove decking laid on a $7/8 \times 5$ inch tongue and groove subfloor. This double floor is supported by four small built-up joists composed of 2 x 6 members with 1 x 4 ledgers vertically attached to either side. Fastened to the upper side of the ledgers is $15/16 \times 3$ inch tongue and groove decking which is 1-7/8 inch below the under side of the subfloor above. (See Drawings: Repainting and Repair of Truman Home 1/16, United States Department of Interior, National Park Service, Midwest Region, Omaha, Nebraska.) Although the span reached by these members is only 4 feet, the live load capacity was determined to be only 30 pounds per square foot. Due to the vertical members attached to either side of what was assumed to be the original structural member, the exact method of conrection at the northern end of the member was not determined. If this porch is to be used extensively, modification of this connection may be justified or at a minimum, slight destructive investigation may be undertaken to determine the exact means of connection.

The south porch (104B) servicing the southern doorway from the living room, is similar in construction to the rear porch. As with the kitchen porch, the weakest point of the construction is the connections, particularly at the intermediate span. Due to these connections, this porch is capable of carrying approximately 15 pounds per square foot live load. The existing joists and intermediate members are capable of supporting approximately an 80 pound per square foot live load with

proper modifications to the end connections. The stairway of this porch, which was in a severely deteriorated state due to moisture and possible insect attack, has been replaced.

The front porch (101A) is similar in construction detailing to the south and kitchen porches. Again due to connection details, the allowable live load is limited to approximately 21 pounds per square foot. Joists and intermediate members are capable of supporting approximately 100 pounds per square foot live load with proper modification of the connections and corner details. 11

Second Floor Sleeping Porch

Storm windows were added to the interior face of the sleeping porch screens by the National Park Service, to prevent rain water from infiltrating the porch deck. The deck was simply constructed over 2 x 4 sleepers which had been nailed through a sheet metal deck. Water infiltration caused the sheet metal to rust and decay badly, and some of the sleepers to rot. Water then penetrated to the bathroom below causing the wallpaper to severely stain. Rather than remove and replace the entire sleeping porch deck and waterproof, storm windows were installed to avoid the extensive damage to historic fabric in repairing the deck. Only a small portion of decking material was replaced. (See Drawing Detail 1 and 2, Sheet 6, from Repainting and Repair of Truman Home (HS-01) Drawings, Truman Home NHS, Independence, Missouri.)

Second Floor Framing and Condition

The floor framing and wall framing systems of the second floor are virtually unknown. An assumption has been made that the general pattern of the first floor is repeated and to some extent this has been verified by an area opened up in bedroom 210 during recent electrical modifications and in an area of bedroom 107 where floor decking is spaced in such a way that several joists are visible. Floor joists, where exposed or otherwise measured, were found to be 2 x 8 members. Floor decking, where exposed in closets and uncarpeted rooms, generally follows a pattern that correlates to a framing system to that on the first floor.

The different time periods of construction and the deviations in room ceiling height become evident at the second floor level. The various rooms on this level vary in floor elevation and are connected by steps. The ceiling of the second floor central hall (202) is distinguished by a level change of approximately 2 feet.

The walls of the second floor seem to be in relatively good shape, particularly surprising considering the partial failure of the beam and joist previously discussed in the south basement room (005).

Within the northwest bedroom (207) a crack was noted on the ceiling running parallel to the west wall and approximately 1/16 of an inch in width at the south end, tapering to a hairline fracture at the north wall. The south wall of this same bedroom has several randomly spaced

diagonal cracks at the extreme upper west corner. The most prominent of these consists of a series of three cracks with plaster damage under the wallpaper. The wallpaper is distressed at the northeast corner of the room; however, paper has not separated.

The west wall of the second floor central hall (202) has minor stressing in the wallpaper although no visible cracks are in evidence. The plaster ceiling of this area adjacent to the stair (202-B) to the attic has separated from the supporting lath and begun to drop down. National Park Service personnel have stabilized this condition by supporting the plaster with screws and large washers fastened into the ceiling joists. Minor cracking was also evident over the stairway from the first floor level over the upper landing. At the western edge of the central hall (202), a small crack crosses the ceiling from the entrance door of the northwest bedroom (207) diagonally across to the entrance of the master bedroom (204).

The areas of distress in the master bedroom (204) were the south wall to the west of the fireplace in that area between the fireplace and the adjacent window and within the ceiling area of the room. A major crack in the ceiling extends approximately from the middle of the fireplace to the middle of the closet door (204-B). Three feet to either side of this crack and parallel to it are cracks of less severity. Also, this area of the ceiling exhibits a noticeable sag. Again, distress was noted in the paper covering walls and ceiling with indications of

plaster separation behind the paper probably caused by moisture penetration from the outside. A water stain was noted on the north wall of this room, approximately 2 feet west of the closet door at the ceiling, with a corresponding drip pattern found on the wallpaper below.

In bedroom 205 also known as the Trumans' bedroom, all the walls are in good condition and noted to be relatively crack free. Some minor cracking was noted on the ceiling running diagonally from the northwest corner to a point south of the east edge of the entrance of the central hall. Three hairline cracks begin from this diagonal crack and run east, parallel to the north wall of the room, diminishing as they continue east.

Bedroom 210 and the passageway (206A) are both in good condition. These walls show no evidence of cracking. Hairline cracks were found in the ceiling of the small bedroom positioned above the area where the floor decking changes direction, approximately 6 feet from the north wall of this room (south of the closet).

Bath 211 has no evidence of cracking but an area of the ceiling adjacent to and south of the bathtub, an area approximately 18×36 inches, has sagged about 2 inches.

The Truman dressing room (209) has cracks in the two corners of the fireplace flue chase from the music room (108) below. There is also a

small bulge in the wallpaper adjacent to the west edge of the doorway (208D-1) in the south wall. At this point there is no evidence of recent cracking and appearances present the possibility of the damage having been there at the time the current layer of wallpaper was applied.

The west wall has a diagonal crack in the upper north corner. The east wall has small hairline cracks adjacent to the entrance doorway (209D-1), one running north from the left corner of the upper doorway trim to the adjacent wall and diagonally south up to the ceiling, another running from the right corner of the upper doorway trim.

Room 213 was used for storage and shows little evidence of any movement or cracking; however, it should be noted that three of the walls were hidden by stored artifacts at the time of this inspection. A split in the floor decking, approximately 26 inches west of the top riser of the stairs going down to the kitchen is possibly part of the repair work resulting from the fire damage found in this section of the residence. 12

Attic Floor Framing and Condition

The main attic area is divided into two levels, 302 and 303, and has approximately 2 feet of elevation differential. This can be explained by the joint which connects the earlier constructed 1867 structure to the 1885 "addition." The lower level floor (302) is distinguished by floor decking laid on 2×4 sleepers lying east-west over what appears

to be 2×6 ceiling joists running in a north-south direction.

There is evidence of a wood truss within the vertical area between the lower and upper attic levels, noted when decking from the upper level was removed during recent electrical work. Diagonal cords could be seen lying east of the stairway connecting the two levels. The square heads of two lag bolts were noted when the treads of the connecting stairway were removed. The purpose of these bolts is unknown at this time, although it is assumed that they connect to the lower cord of the truss.

The upper level (303) is structurally composed of 2 x 6 floor joists that are notched at the ends to bear on 2 x 2 plates fastened at the base of double 2 x 6 support members. These supporting members align over the morth-south wall of the rooms of the second floor. 13

Roof Framing and Conditions

Attic Roof

Due to the installation of an insulation board and 1 x 8 sheet batten, the exact rafter framing is not known. (See Roof Framing plan.) In the areas that have been exposed, the structural members were found to be 2 x 6 rafters spaced approximately 24 inches on center. These rafters support 1 x 10 roof decking. Various rafters are reinforced at the lower limits by additional 2 x 6 or 1 x 6 members attached to one or both sides of the rafter. A perimeter dogleg rafter assembly is constructed by notching a 1 or 2 x 6 rafter to it over a 1 x 6 plate

sitting on the floor joist (upper level 303) or shot joist (lower level 302), as the case may be. The dogleg rafters gain additional support by the decorative diagonal bracing noted on the exterior elevations.

To compensate for the elevation differential between the attic levels, the lower level (302) has a perimeter short wall constructed of 2 x 4 members. This 2 foot high wall supports a 2 x 6 member approximately 2 feet in length sitting vertically on the short wall and perpendicular to it, similar to a short joist. The free, interior end of this short joist is capped by a continuous 1 x 6 header. This joist-like member is topped by a 1 x 6 lying flat over which the 2 x 6 roof rafters are notched in "bird-mouth" fashion. The assembly as constructed would be unable to resist more than a minimal horizontal thrust from the rafters. At some point additional bracing in the form of 1 x 6, tongue and groove members was attached between the rafters and the floor (ceiling) joists. The bracing is spaced at approximately 4 foot centers and is evident along all three exterior walls of the lower level. These diagonal braces, in conjunction with the stiffness developed by the nailed connections in the short wall, offer the limited resistance to outward thrust caused by the weight of the roof and rafter assembly and any additional loading placed by snow and wind forces. 14

Attic Dormers

The four window dormers of the attic space reflect two different methods of construction. The north and west window assemblies are of a more

decorative nature and have a dogleg roof similar to the main structure. These two gables are constructed of tapered 2 x 6 rafters supported on 2 x 4 frame walls. The dogleg is formed by a 2 x 4 positioned horizontally and attached to adjacent rafters on either side of the gable. The two east window gables are constructed of 2 x 4 rafters lying flat supported on 2 x 4 frame walls. These eastern gables have no roof overhang. 15

Kitchen Wing Roof

The attic space (301) over the kitchen and storage area is a more typical gable system of rafters and ceiling joists. This system is composed of 2 x 6 and 1 x 6 members. This area has had extensive fire damage and new rafters have been attached adjacent to the damaged units. This reinforcement is true of virtually every structural member in this area except for the four rafters and joists farthest east which were completely replaced. This roof area is distinguished by a hip roof area beginning at the level of the fascia of the main roof. The moderately sloped area of this roof is constructed using 1 x 6 rafters. Most of this framing appears to be of the same vintage as the replacement joist and rafters, leading to speculation that the original 1 x 6 members were totally destroyed by the fire which, as previously mentioned, occurred sometime between 1885 and 1920. 17

Roofing Materials

In 1969, "as a result of winter ice damage and a severe July hail storm,

the eighty-year-old original slate roof was beyond repair." As a replacement, the Trumans chose a new type of shingle on the market. They selected royal grey, GAF fiberglass and asbestos 300 pound Fire-guard (two-tab) shingles with a number 9 granual. Since these shingles have been in place for sixteen years, they are nearing the end of their serviceable life. However, production of this type of shingle was discontinued by GAF in 1984. No other shingle manufacturer currently makes two-tab shingles. GAF can produce these shingles on custom order, but requires a minimum quantity of 1,000 squares. About 34 squares are needed to reroof the Truman home.

In March and April of 1984 the flat seam metal roofing, gutters and downspouts were replaced. The old metal roofing was corroded and had been coated with bitumen.

Wall System Framing (See Appendix F.)

Eight sections of exterior walls were investigated in 1984 by the National Park Service. In general, three different wall systems were encountered: walls with brick nogging but without sheathing; walls with studs laid flat forming a 2 inch cavity and sheathing; and walls with both brick nogging and sheathing. From the data collected in the investigation, it was determined that most of the exterior walls are balloon framed.

The sheathing and siding applied over the kitchen wing walls appear to

have been added after 1900. In addition, paint samples taken from this section of the structure, match those from 1885 construction, indicating residing was done. This may correlate with an extensive kitchen wing fire around the same period. The brick nogging dates the construction of the wing as the earliest portion of the structure, but wire nails, rosin sized building paper, and the very clean surface of the sheathing indicates these as replacement materials after the fire.

A similar type of construction exists in the 1867 portion of the structure but without sheathing. To existing knowledge, poplar siding occurs only in this portion of the house. The remainder of the structure's siding is white pine. (See Fig. 2.6.)

The walls of the portion of the house encompassing the living room (104), Gates' bedroom (105), foyer (107), and the southern portion of the dining room (110), are constructed of 2 x 2 study laminated from 1 x 2 material or 2 x 3-1/2 (laid flat) balloon framed study forming a 2 inch cavity. Seven-eighths inch tongue and groove sheathing is fastened horizontally with cut nails. No nogging was encountered here.

All sheathing encountered is tongue and groove white pine in good condition. All stud material encountered is oak, in good condition. The brick nogging (laid in shiner course) and mortar joints encountered are in good condition. 19

Exterior and Interior Stair Systems

The exterior stair systems are in good condition having recently been repaired or replaced and repainted.

The main interior stair (108A) is in basically sound condition although some minor problems exist. There is no evidence of the framing pulling away from the wall or excessive deflection in the outside stringer. When walked upon, creaking of the stair is minimal except at one or two isolated treads. The treads and risers, which are painted or stained black are covered with a grey carpet runner. The newell posts and balusters are stained a very deep mahogany whereas the railing is stained brown. The lower ends of some balusters are loose where they are mortised into the treads. Nosing at the side of the treads displays varying degree of looseness, partially caused by Margaret Truman climbing on them as a child.²⁰ The finish is worn in limited areas. The base of the lower newell post is split vertically on the west side.

The attic stair (202B) is in fair-to-poor condition, having been damaged at the lower end by water leaking through the roof above which has eroded the finish and exposed the bare wood. This stair is comprised of oak treads and risers stained brown, pine stringers which are grained to resemble oak, walnut turned spindles stained nearly black and a brown stained railing. The turned spindles are quite loose where they fit into the rail or treads and can easily be pulled from their sockets. Carpet rod holders on the treads indicate that these steps were carpeted

sometime in the past.

Exterior Envelope

The siding on the Truman home is clapboard with 4-1/2 inch average exposure and is painted white. On the 1867 portion of the structure the clapboard is poplar except on the kitchen wing which is white pine. The clapboard on the 1885 portion is white pine. The difference in siding materials on the 1867 portion and the kitchen wing may be attributed to a fire that occurred after 1885 (date unknown) and resulted in the original siding being replaced. All siding, millwork, brackets, porch ceilings, and fascia are now in good condition having recently been restored. Work included stripping of most paint finishes to bare wood, woodwork repair, and painting of all exterior surfaces. (See Drawings: Repainting/Repair of Truman Home 4/11/85.)

Windows

All foundation and main structure windows are wood sash and prior to restoration, were in very poor condition with loose glazing, broken glass and rotted sash. Window repair included reputtying, reglazing and replacement of deteriorated window components. Except for broken or missing sash cords at windows 108:W-2 (A and B), 113:W-1, 201:W-1 (A), 204 A:W-2, 205:W-3 and 211:2-1, all windows are now in good condition.

Windows are painted green on the exterior and stained and varnished or painted on the interior depending on location. The bottom rails of some

lower sash exhibit minor water staining, worn finish, or crazing of paint on the interior. The paint of the upper and lower sash (211:W-1) in bathroom 214 is crazed throughout.

Originally each window on the first and second floors except in the kitchen (113), bathroom (211), and storage room (213) had an upper and lower pair of interior shutters as evidenced by the four recesses on the side of each window frame. Each lower and upper leaf would normally be supported by two hinges. Cut-outs for such hinges and their associated screw holes are still visible. Certain cut-outs have been filled in but are still evident.²²

Wood storm sash are in place on the following windows: 104:W-1, 104A:W-1(B), 105:W-1(A and B), 108:W-1(A and B), 108:W-2(A and B), 109A:W-1(A and B), 109A:W-2, 109A:W-3, and 112:W-1. Storm windows are in good condition and painted white. Storm windows are hung from two metal sash hangers and secured at the sides with metal turn buttons. Parts of the storm window hardware are extant on some other windows. Prefinished bronze color aluminum storm windows were installed in 1985 on the interior side of the east and south elevations of sleeping porch (260) to direct rain water away from the sleeping porch floor.

Wooden framed screens are stored in the Carriage house. The frames are painted green and are in fair condition.

The attic jalousie windows which replaced wooden sash in 1953, are fitted with interior screens.

Doors

The wood exterior entrance doors and wood storm doors are in good operating condition. Both types of doors are painted white. The north jamb of the basement door 002:D-1 was rebuilt in 1985. Constant use had loosened the wall blocking built into the stone foundation. The screen door 002:D2 was rescreened in 1985.

The interior doors are generally in fair-to-good repair except for three doors that bind and have chipped, nicked, and worn finishes. The west pocket door, 103:D-1(A), at the parlor is jammed and the east pocket door binds as it is opened. This condition is caused by insufficient clearance above the carpet and a slight sag of the lintel over the door opening. Closet door D-2 in master bedroom (204) binds at the bottom and will not close completely. The finish on interior doors is stain and varnish, paint, or pine grained to resemble oak, depending on location.

Exterior Finishes

The Truman home was repainted between October, 1984 and November, 1985, because of the poor condition of exterior finishes. "Examination of the exterior paint finishes in areas directly exposed to the elements revealed severe paint film failure, including cross-grain cracking,

alligatoring, and peeling. Even in places shielded by porches and cornices, moderate paint film failure had occurred. A number of exposed areas, including soffits, fasciae, and siding experienced near total paint failure due to recurrent moisture penetration from deteriorated roofs and built in gutters. . . . more than twenty coats of paint concealed deteriorated woodwork and cladding from direct examination. On much of the projecting millwork, the final layers of paint had been applied so heavily that stalactites in excess of 1/4 inch were apparent due to paint dripping."23 The scope of the work included thermal removal (heat gun) of most paint from exterior painted wood surfaces to achieve a sound surface for painting; repair or replacement of any deteriorated portions of cornices, brackets, fascia, soffits, siding, barge boards, posts, railings, balusters, porch flooring, ceilings and steps, skirting, lattice, windows and doors; application of caulk; and repainting the exterior including metal roofs. All exterior woodwork, windows and doors received one coat of Pratt & Lambert Permalize alkyd primer and two coats of Pratt & Lambert Permalize alkyd house paint in a gloss finish. Siding, millwork, doors, and storm windows are white. Window sash is green. A grey Pratt & Lambert Effecto enamel was applied to exterior porch floors. White Effecto enamel was used on all exterior metal surfaces including flat seam metal roofs, gutters, downspouts, and built-in gutters.²⁴

A paint analysis performed in May, 1986 revealed that the siding was painted a rust-red in 1867 and light green in 1885. The 1867 trim color

was warm grey which was changed to dark green in 1885. 25

Interior Finishes

The interior building fabric is generally in fair-to-good condition except for certain ceilings - foyer (102)/central hall (103), dining room (110), master bedroom (204), central hall (202), and bathroom (211) - and portions of walls that show major distress, peeling wallpaper, and water stains. The walls are papered throughout whereas the ceilings are either papered or painted. Wallpaper patterns range from simple geometric designs to large floral prints with contrasting border. Areas where peeling wallpaper is a major problem are the Gates' bathroom (106) and the third floor vestibule (304). Only two of the painted ceilings, foyer (102)/central hall (103) and Margaret's childhood bedroom (210) have paint applied directly to the plaster. On the other painted ceilings, paint has been applied over wallpaper, a fabric liner or a 1/8 inch thick fiberboard panel.

The majority of the cracks in the walls and ceilings are minor and should not change to any great extent in the absence of water penetration or structural settlement. (See Existing Condition Drawings, No. 5, First Floor Plan.) Fluctuations of temperature and humidity will cause slight changes in these cracks. Minor cracks should be left "as is," but monitored carefully for any changes that could result in further deterioration. Complete repair of all cracks would necessitate removing and installing new wallpaper throughout the house. Although it

may be possible to replicate the existing patterns, the historic character of the existing fabric would be lost. The sagging ceilings are a result of the failure of the plaster keys between the wood laths with water damage a contributing factor. Stabilization of these ceilings will be required soon.

Carpeting in the dining room (110), and foyer (102)/central hall (103) is in good condition having been installed in the spring of 1984. The new carpet matches the historic carpet in color and weave except for a dark grey sewn-in runner that guides the visitors through the house. The historic carpet was carefully removed and is in storage. The existing carpet throughout the remainder of the house is in relatively good condition, free of severe worn spots or snags.

Encaustic tile in the front vestibule (101) and the three fireplace hearths are in good condition. The light blue, stippled glaze ceramic tile tub surround and wainscoting in bath 211 is sound as is the white ceramic backsplash above the kitchen sink. In the Gates' bathroom (106) the mastic on the yellow ceramic tile and dark green border has begun to fail causing tiles to fall off the wall. The failure of the tiles to adhere to the wall was affected by water leaking through the ceiling from the sleeping porch above. Leaking of water has been repaired. Due to the poor condition of the mastic, tiles will continue to fall off sporadically.

The base, window, and door moldings are in good condition except for certain window sills which display water stains, exposed bare wood and crazed paint. In addition some of these have split longitudinally.

The lincrusta in foyer (102)/central hall (103), foyer (107) and stair (108A) shows some diagonal and horizontal cracks and localized pulling away from the substrate. The section on the north wall of foyer has been coated with a gloss finish, possibly shellac or varnish and there is evidence of a previous repair; underneath the stair, which was poorly executed. There are three small areas which are missing.

The historic ceiling finish in the basement was 16-1/2 inch x 30-1/4 inch x 1/2 inch tongue and groove Cel-O-Tex panels fastened to the underside of 1 x 4 nailers laid perpendicular and secured to the lower edge of the floor joists. The Cel-O-Tex panels were removed in 1983 to permit investigation of electrical wiring above. The 1 x 4 nailers are extant; the panels were too damaged to salvage.

The new attic (302, 303) and window bay (302-A) has a finished ceiling of 4 foot x 8 foot x 5/16 inch sheets of Cel-O-Tex with butt joints and white finish surface. The sheets are full size or trimmed as required and are nailed directly to the underside of the sloped roof rafters or to 1 x 4 nailers fastened to the underside of the sheathing boards at the flat roof. Numerous panels are missing for a variety of reasons; nails used had insufficient head diameter for adequate support, panels

were removed for installation of electrical and security wiring, and the panels in the east dormer (window 302:W-4) of the lower level were lost due to a localized fire in 1985. Debris in the stud space on the north side of the dormer was ignited by a heat gun during the process of exterior paint removal. In anticipation of replacing the asphalt shingle roof (originally scheduled for the fall of 1986, but delayed due to the difficulty of obtaining material to match the historic asphalt shingles), National Park Service personnel have hung visqueen for protection in areas where the Cel-O-Tex panels are missing.

Plumbing Services and Systems

The main water service to the house is provided by a 3/4 inch galvanized steel pipe which enters through the north wall of the basement in the laundry room (002). At this location, a main cut-off valve is installed. From the cut-off valve, the cold water piping, replaced in April, 1985, is then distributed to the domestic hot water heater, bathrooms, kitchen sink, lavatories, washing machine and wall hydrants. All the cold water piping is exposed on the basement ceiling with the exception of the vertical piping to the second floor bath and bedroom lavatory. ²⁶

The house has a non-historic electric domestic hot water heater located in laundry room (002). This water heater was installed in 1984 for the use of National Park Service personnel at a non-historic basement sink. The historic gas-fired heater, installed in 1974, was drained, but not

disconnected. From the historic hot water heater, the hot water piping is distributed to the bathrooms, kitchen sink, washing machine and lavatories. All the hot water piping is exposed on the basement ceiling with the exception of the vertical piping to the second floor bath and bedroom lavatory. ²⁷

Waste and Vent System

All the plumbing fixtures in the home have cast iron, lead or galvanized waste piping until the piping penetrates the basement floor where all waste piping becomes cast iron under the concrete slab.

The Gates' bedroom (106) on the first floor has a 4 inch cast iron vent stack up through roof R-6. Bathroom (211) on the second floor has a 2 inch cast iron vent up through the old attic (301) roof.

The lavatory in Truman bedroom (205) on the second floor, the kitchen sink unit in kitchen (113) on the first floor, and the water closet (007) are not vented to the atmosphere. 28

Gas System

Historic (c. 1885) System

There is evidence of a gas system in the walls and ceilings which supplied gas to fixtures. Known terminations include the dining room (110) chandelier and the music room (108) gas fixture.

Existing System

The main gas service to the house is provided by a 1-1/4 inch black steel pipe which enters through the west wall of the basement in furnace room (004). The main gas service then passes through a main gas cock and pressure reducing valve before entering the gas meter which is located on the west wall of furnace room (004). From the gas meter the gas piping is then distributed to the furnaces, domestic hot water heater, space heater, ranges, and yard lamp through underground copper pipe. All the gas piping is black steel with the exception of one section of pipe which is copper. This copper pipe has been noted on the basement plumbing drawings. All the gas piping is exposed on the basement ceiling with few exceptions. ²⁹

Heating System

Historic

The original heating system relied on the use of three extant fireplaces (located in rooms 104, 204 and 108), in addition to "an undetermined number of stoves." The exact date in which the central heating plant was installed in the Gates' mansion is not known but it is probable that it occurred between the years 1885-1910. Fuel was first wood, then coal and finally gas. 30

There is physical evidence of an old gravity-type furnace. (See Existing Condition Drawings, No. 4, Foundation/Basement Plan, Room 005/006.) This area, where the furnace was located, is about 6 inches

lower than the surrounding floor. In this location there is a concrete area with a definite edge that is approximately circular in shape, corresponding to a furnace. In addition, there are bricks that follow the shape of the concrete and remains of asbestos paper that have been nailed to the underside of the joists and flooring directly above the floor area previously described. There is also an underfloor duct that starts at the edge of the recessed area and runs several feet to the east, ending with an opening in the floor.

Two individual gravity-type furnaces (Model 1135, each at 135,000 BTU/HR input LAN-A-15) with a common supply and return plenum were installed sometime during the mid 1950s. In 1959, a modification was made to the furnaces by installing a belt-driven fan inside the return air plenum which converted the heating from a gravity-type to a forced air system.

The house is presently heated by a pair of Carrier, induced-draft gasfired furnaces located in furnace room (004) replacing the historic gas furnace in 1985. (The metal casing from the historic furnace was salvaged.)

Ductwork

The furnaces supply air to the first and second floors through round and rectangular ductwork to floor and wall supply grilles. On the first floor there are transfer grilles installed in the ceiling of the dining room (110) and kitchen (113), which transfers heat from these areas

through floor grilles in bedroom (210) and storage room (213) on the second floor.

Return air is transferred from the first floor through floor grilles and ductwork to the filters in the furnace. The second floor has no ducted return air system. All ductwork and grilles are historic except those modified near the furnace to accommodate the new system.

A single Honeywell wall thermostat located in central hall (103) historically controlled the space heating temperature for the house. A new thermostat was installed in the music room (108) in 1985.

A small gas space heater is located in kitchen (113). This unit was used for supplementary heat for that area with some heat passing to the storage room above through the ceiling transfer grille.³¹

Gas Yard Lamp and Interior Gas Fixtures

In 1964, Hadco Products, Inc., of Littletown, Pennsylvania, presented the Trumans with a 6 foot "Gettysburg" style gas lamp made of cast aluminum and solid brass accents standing on a concrete pedestal. The gas lamp stands to the east of the main entrance of the Truman home.

Much of the gas tubing to the original overhead lighting system remains extant behind the walls and ceilings. The chandelier in the parlor/music room (108) remains connected to the historic gas system. 32

Locations of capped pipe of the historic gas system which extend through the ceiling include the laundry room (002), vestibule (101), butler's pantry (111) and hall (208).

Ventilation System

The house is ventilated by means of a single speed belt-driven fan located in the lower level (302) of the attic. This fan is controlled by a Honeywell timer located at the bottom of attic stair (202B). When the fan is in operation, the air that is exhausted from the house is relieved from the attic space through attic dormer jalousie windows. If the fan is not in operation, the inlet to the fan is covered by a pair of hinged doors at the top of stair (202B).

In addition, a four-bladed ceiling fan (no manufacturer identification) is located on the kitchen porch (114C).

Air-Conditioning System

Historic

Some limited air-conditioning in the house was provided by spot cooling from two window air-conditioning units on the first floor. One air-conditioning unit is located in the west window of the Gates' bedroom (105), and the other is in the north window of the kitchen (113). Both window air-conditioners are factory package units with all controls located on the front of the unit. These units were removed and placed in storage in 1985. The library (109) windows 109A W1:B also had an air

conditioner which was seasonally installed. It was removed before National Park Service acquisition during the fall of 1982.

Non-Historic

In October, 1985, two outdoor condensing units (Carrier, series 38) were installed on new concrete pads, north side of kitchen (113) in an effort to control summer interior humidity and temperature levels.

Electrical Service and Systems

The house currently is serviced by an electrical system installed in 1983-84. The original electrical equipment and wiring have been disconnected and left in place. All original lighting fixtures have been left in place and are operational. The house originally used gas lighting, one fixture of which is still in place in the parlor/music room (108). The house was converted to electric service sometime between 1886 and 1907.

The house is presently utilizing a 200 Ampere, single phase, 110/220 volt, residential service which is fed underground from a power pole located along the south edge of Truman Road. The meter housings, historic and non-historic, are located on the north side of the house. The original aerial service conductors and service entrance equipment have been disconnected and left in place adjacent to the new service.

The in-place service switchgear consists of one main 200 Ampere distribution panel and four sub-panels located on the north wall of laundry room (002). The four sub-panels supply respectively: basement; first floor; second floor; garage, gates and porchlights. Historic service panels are located immediately west of the new equipment and consist of a main 110 Ampere breaker panel and one sub-panel.

The original wiring is comprised of open type knob and tube and some non-metallic sheathed cable. All exposed original wiring in basement and attic areas have been disconnected and left in place. In-place wiring was run in electrical metallic tubing and flexible metallic tubing which was fished between existing wall spaces during 1983-1984 electrical renovation.

The majority of receptacles and wall switches are original 2-wire type. Some receptacles and wall switches were replaced with U.L. listed types in 1984. An electric hot water tank was also added at this time. The original attic ventilating fan is functional and controlled by a Honeywell timer located at the base of attic stairway. Bathrooms (106) and (211) both utilize wall mounted 110 volt electric space heaters.

Lighting fixtures throughout the house are functional, original units, except on the west wall of the kitchen where new switches were installed to operate yard lamps since the switch boxes on the south wall were inaccessible. These are now disconnected. Two switches, one at the west

gate and one at the foyer (102) painted red, are unidentifiable.

Lighting is predominately incandescent with fluorescent wall strips in the bathrooms and a single ceiling fixture in the kitchen. Bedrooms (105, 201, 205, 207, 210), living room (104), music room (108), and entryway (103) utilize incandescent wall sconces with supplemental table and floor lamps. Exterior lighting is incandescent with one pendant fixture on the east porch and west porch ceiling, in addition to a lamp at the southeast corner of the kitchen porch. 35

Lightning Protection System

A lightning protection system was installed in August, 1985 on the Truman home (HS-O1), the Carriage house (HS-O2), and the specimen oak southeast of the Gates' bathroom (106). It consists of 3/8 inch diameter by either 15 inch or 48 inch long copper point, nickel plated terminal rods connected by copper cable, leaded, to 1/2 inch diameter by 10 foot long copperclad steel ground rods. The shorter terminal rods are located at the ridge of each gable - main roof and dormers - of the Truman home as well as the ridge of each gable and the center of the cupola of the Carriage house. The longer terminal rods are used on the chimneys of the home and four 30 inch terminal rods - one primary at the apex and three secondary - are located in the upper branches of the specimen oak. The home is grounded at four exterior locations; the northeast corner of the library (109), the northwest corner of front porch (101-A), the southwest corner of living room (104) and the southeast corner of the Gates' bathroom (106). The terminal rods

located in the specimen oak also connect to this ground rod as well as to a ground rod approximately 25 feet southeast of the trunk of the tree. The ground rods for the Carriage house are located at its northeast and southwest corners and are interconnected with the weathervane. The grounding cable on the house is painted white and is interconnected with the metal roof.

Security and Fire Detection Systems

The existing alarm panel, installed in 1985, is located east of the electrical service equipment in basement (002). The fire alarm system is zone type utilizing photo-electric and ionization type smoke detectors and fixed temperature sensors located throughout the house. There is one manual fire pull located at the exit in the basement laundry room (002).

The intrusion security is maintained through the use of passive infrared motion detectors, photo-electric eyes and door contactors which are tied to the main alarm panel.

Perimeter alarms are signaled by way of two horns and two sirens located in the kitchen pantry (112), alcove (201) and at the east and west exterior attic windows. The fire and intrusion alarms are monitored by a central station alarm company. The fire alarm system is also monitored by the local fire department. 36

Communication Systems

The telephone service has been run underground with original aerial service conductors disconnected and left in place. Service to the house originates from a pole located on the north side of the alley with conductors running underground and terminating in the basement (006). The in-place cable has five line capacity. Three lines are currently in service; two are dedicated for alarm and security purposes and one is for telephone communications.³⁷

The historic telephone service (abandoned) connects to the house on the south elevation. Two overhead cables are secured to porcelain insulators on metal angles, one above the other. Approximately 8 inches to the east of each insulator is a second porcelain insulator identical to the first, but without any wire connection. The two cables drop parallel with the east side of the Gates' bedroom (105) window. One cable enters the house through a hole in the water table. The other enters a metal conduit which extends from the water table to grade and is anchored at the water table with a metal strap. The abandoned service terminates in the east end of the basement (006). The two overhead cables connect to a pole in the south alley, southeasterly from the point of entry into the house.

In addition, a butler bell system could be activated from the Gates' bedroom (105) to ring bells in the Truman bedroom (205) and in the

kitchen (113). Bess Truman could summon a nurse by pressing a button on the end of a 15 to 20 foot cord.

Notes to Chapter Two

- 1. Restoration Associates, a division of Solomon Claybaugh Young Architects, Inc., "Analysis of Condition Report HS-1 Truman Home, Truman Home National Historic Site" (Kansas City, February 14, 1985, bound copy), 2.1. Hereafter cited as "ACR."
- 2. Members of the National Park Service staff include: Skip Brooks, Facility Manager; Alan O'Bright, Historical Architect; Michael Lee and Lee Jamison, Exhibit Specialists (Restoration).
- 3. ACR., 1.1; 1.2.
- 4. Ibid., 1.3.
- 5. Ron Cockrell, Historic Structures Report: History and Significance. Harry S Truman National Historic Site, Independence, Missouri (Omaha: National Park Service, Midwest Regional Office, 1984), 146. Hereafter cited as "HSR."
- 6. Ibid., 128.
- 7. ACR., 2.2.
- 8. Ibid., 2.3A.
- 9. Michael Lee and Alan O'Bright, "Physical Investigation Report Truman Home (HS-O1) Harry S Truman National Historic Site" (United States Department of the Interior, National Park Service Midwest Region, Omaha, Nebraska, July 24-26, 1984, photocopy), 3. Hereafter cited as "PIR."
- 10. ACR., 2.3B.
- 11. Ibid., 2.4.
- 12. Ibid., 2.5.
- 13. Ibid., 2.6.
- 14. Ibid., 2.7A.
- 15. Ibid., 2.7B.
- 16. Ibid., 2.7C.
- 17. Existing physical evidence substantiating this theory is as follows: 1) The roof over the kitchen wing (113) was altered from a gable to a gambrel in 1885 [or thereafter but prior to 1907], to be consistent with the roof(s) on the other sections of the existing house. Although the upper portion of the gambrel had to be replaced as a result of the fire, the collar beams and companion vertical supports at the

western end are charred. These charred collar beams are not extant from the 1867 gable roof because they do not lap either side of the lower roof rafters, but are in line with them; a position only plausible with the gambrel configuration. Consequently, the fire could only have occurred after 1885. 2) Porcelain insulators for the knob and tube electric wiring have been nailed to the charred rafters. The insulators are in good condition and do not exhibit any cracking or blistering associated with intense heat or smoke damage — indicating that the knob and the tube wiring was installed after the fire. Electricity generated by the city was available approximately in 1902. A private electric company may have furnished power prior to 1901 when its generating facility was destroyed by fire. However, 219 North Delaware was most likely outside the limits of its service. Knob and tube wiring was no longer used after 1915-1920.

- 18. HSR., 265.
- 19. PIR., 2-3.
- 20. Steve Harrison, interview with Doug Wasama at the Truman home, September, 1986.
- 21. Alan O'Bright, "Exterior Woodwork Number 2, Preservation Tech Notes," (United States Department of the Interior, National Park Service Midwest Region, Omaha, Nebraska, June 18, 1986, photocopy), 2-3. Hereafter cited as "Preservation Tech Notes."
- 22. Recent National Park Service investigation found that two windows in the kitchen wing were removed for replacement and these had square weights made of cast-iron. The windows (112:W1 and 113:W1) were on the first floor north side next to the basement stairs and pantry. Other windows replaced in the home were generally on the second floor and had round weights.
- 23. Preservation Tech Notes., 2-3.
- 24. National Park Service, "Exterior Painting and Repair of Truman Home (HS-01), Harry S Truman National Historic Site, Independence, Missouri." (nd, photocopy), 1-6.
- 25. Marie Carden., 14.
- 26. ACR., 4.2.
- 27. Ibid., 4.3.
- 28. Ibid., 4.4.
- 29. Ibid., 4.1.
- 30. HSR., 303-304.

- 31. ACR., 5.1.
- 32. HSR., 257-258.
- 33. ACR., 5.2.
- 34. Ibid., 5.3.
- 35. M. A. Panethiere, "Electrical Report, Harry S Truman House" (Kansas City: Associated Engineering Consultants, March 31, 1986, photocopy), 1-2.
- 36. Ibid., 2.
- 37. Ibid.



Fig. 2.1 Truman Home, February-March 1986. West elevation (looking east). Credit: Zoom Studios



Fig. 2.2 Truman Home, February-March 1986. North elevation (looking south). Credit: Zoom Studios



Fig.2.3 Truman Home, February-March 1986. East elevation (looking west). Credit: Zoom Studios



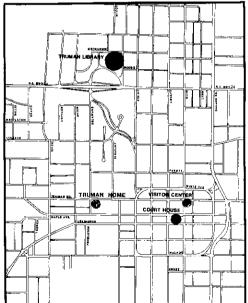
Fig. 2.4 Truman Home, February-March 1986. South elevation (looking north). Credit: Zoom Studios



Fig. 2.6 Brick Nogging, Truman Home. North elevation, July 1984. Credit: National Park Service, Midwest Region









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HS-2 Truman Garage

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HS-1 Truman Home Chronology Drawings

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- 1910 1987

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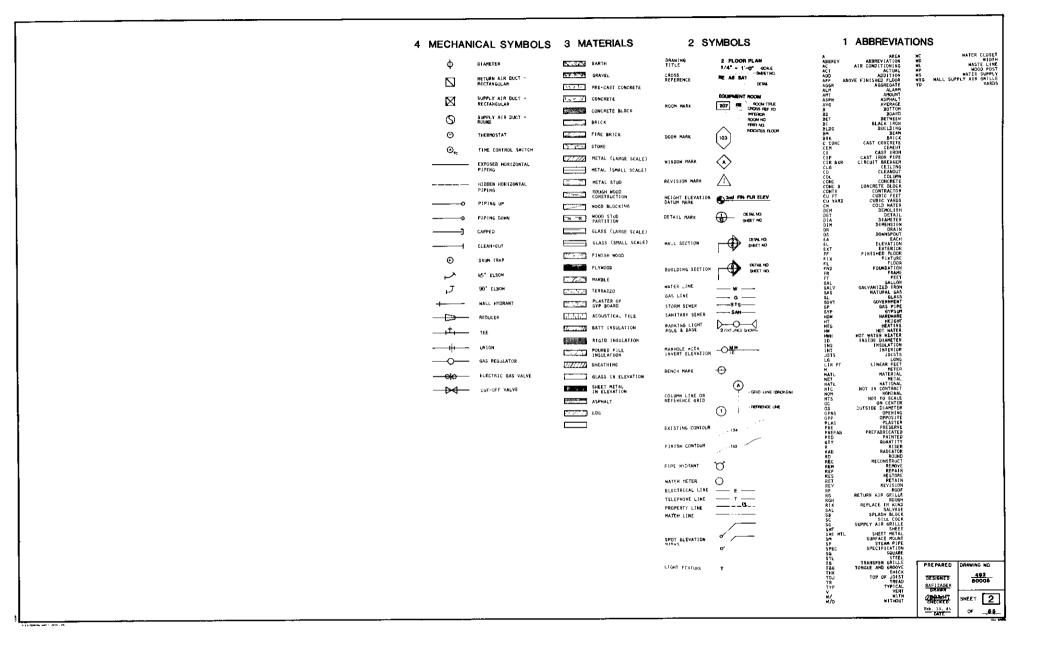
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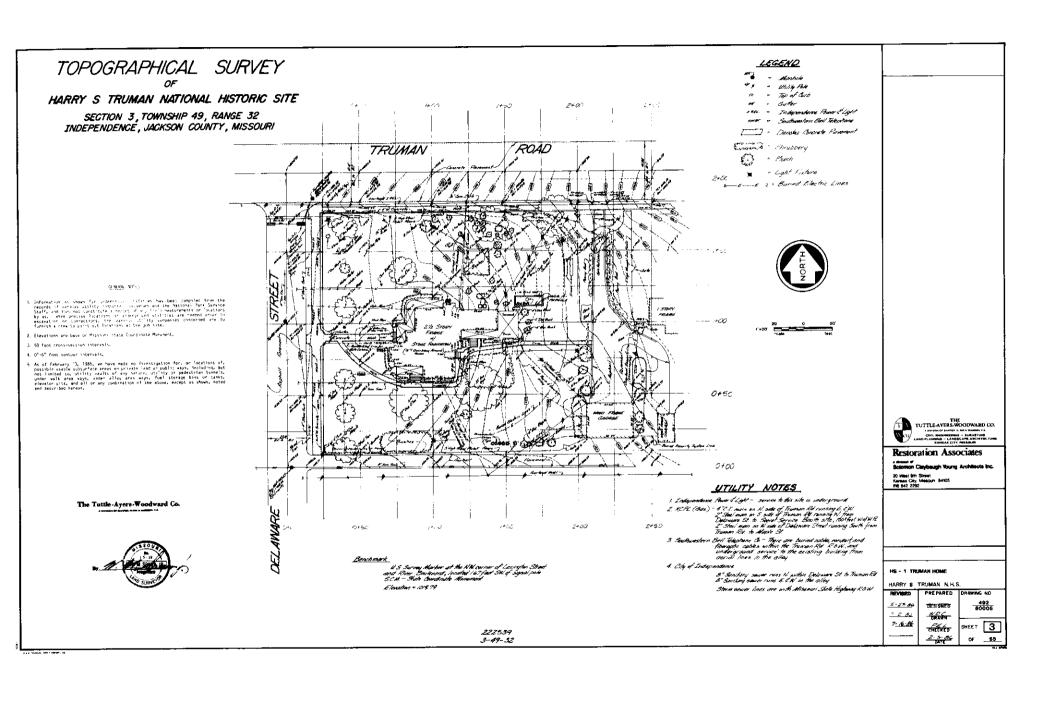
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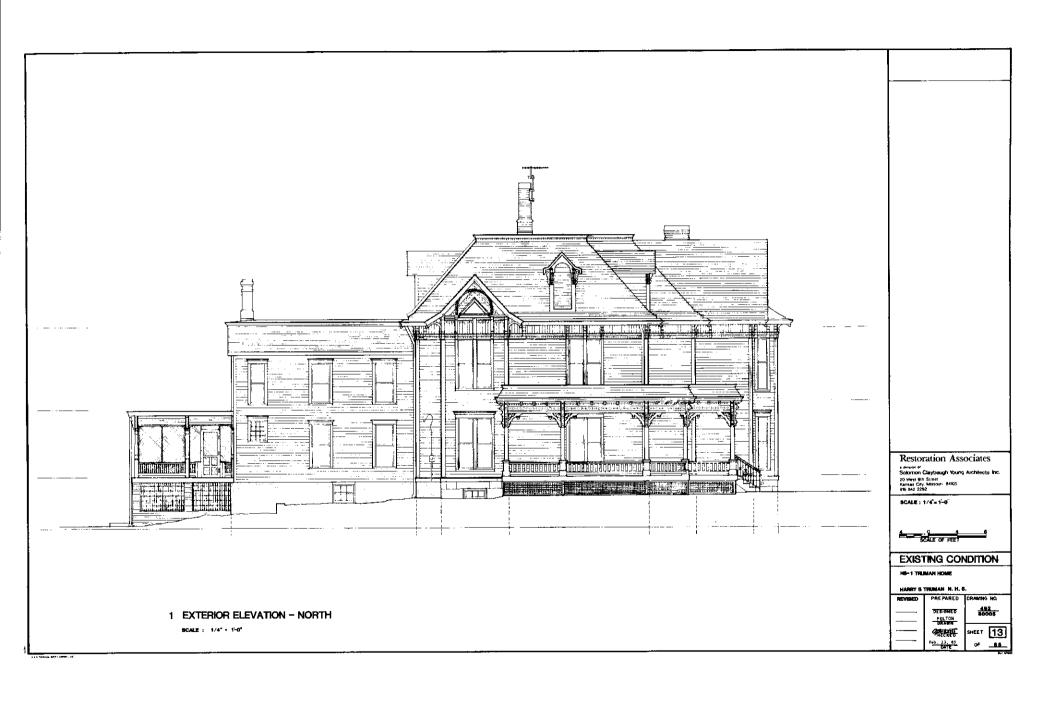
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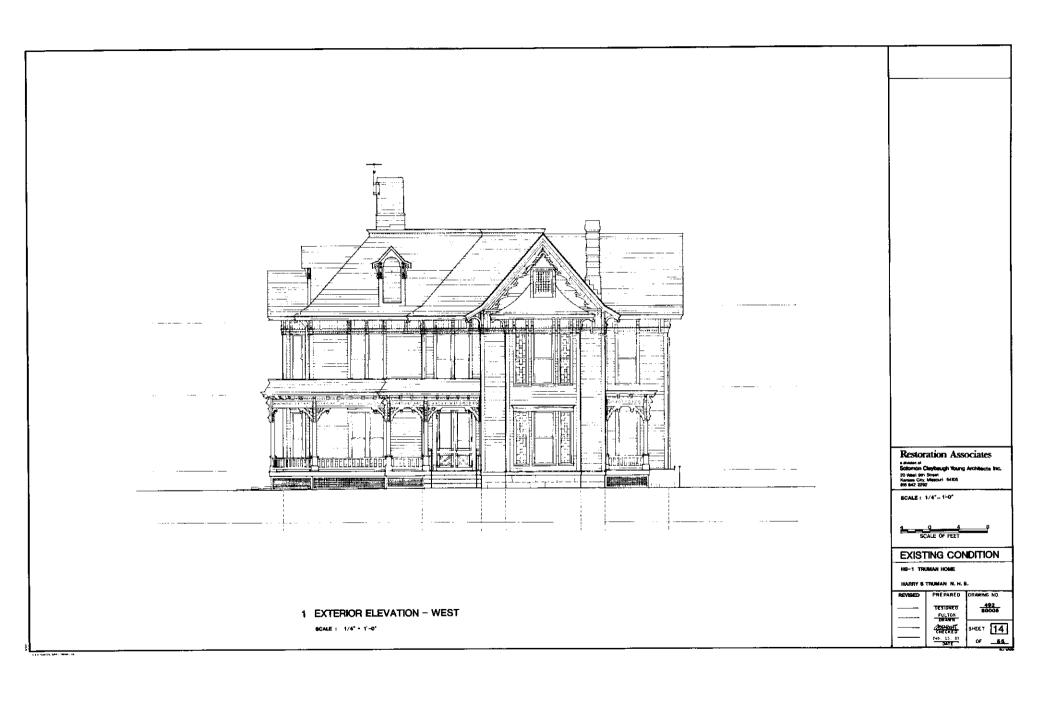
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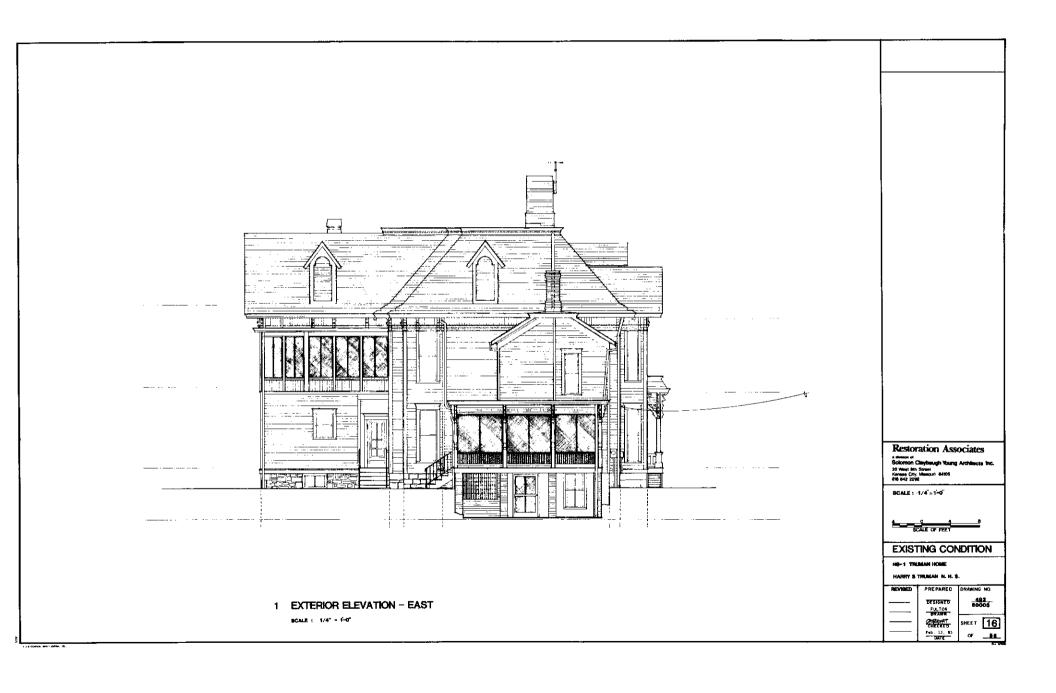


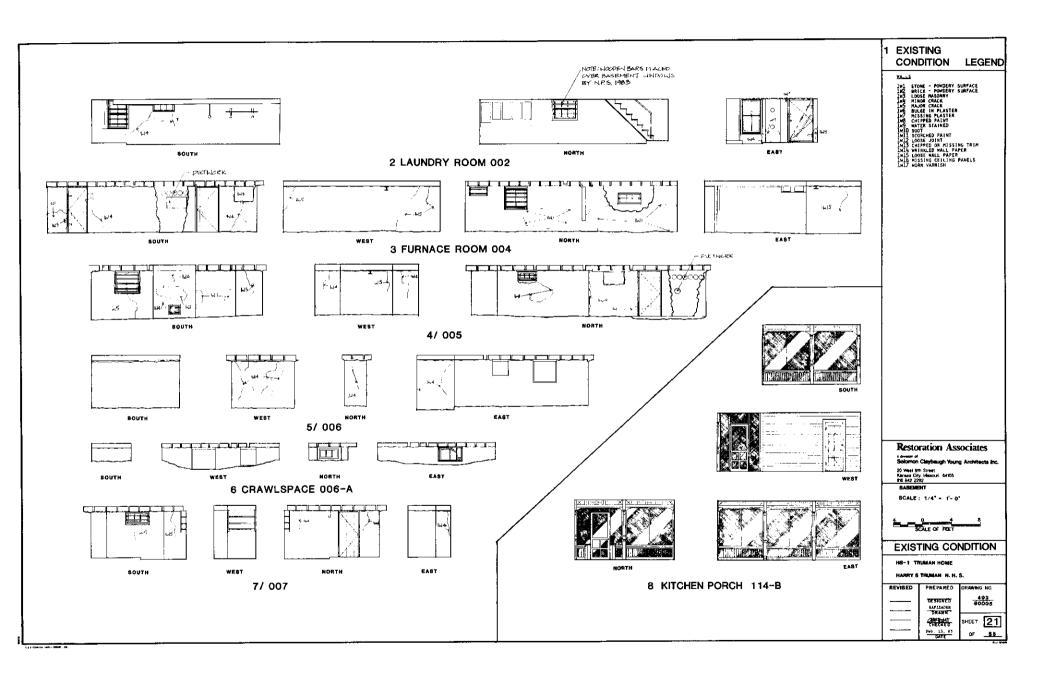


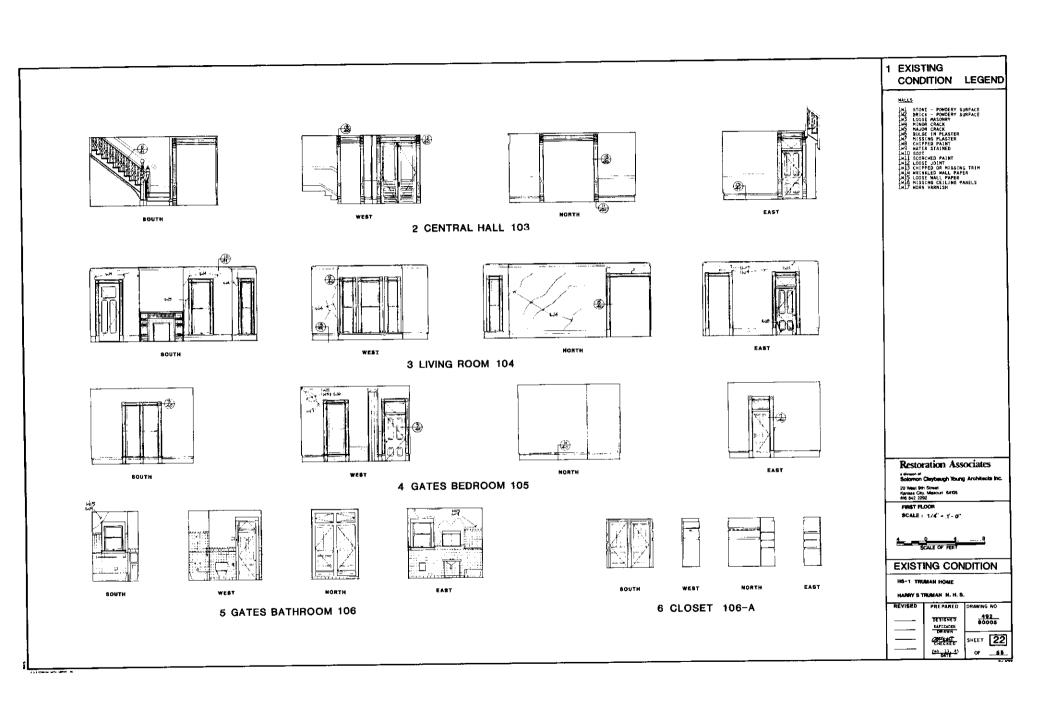


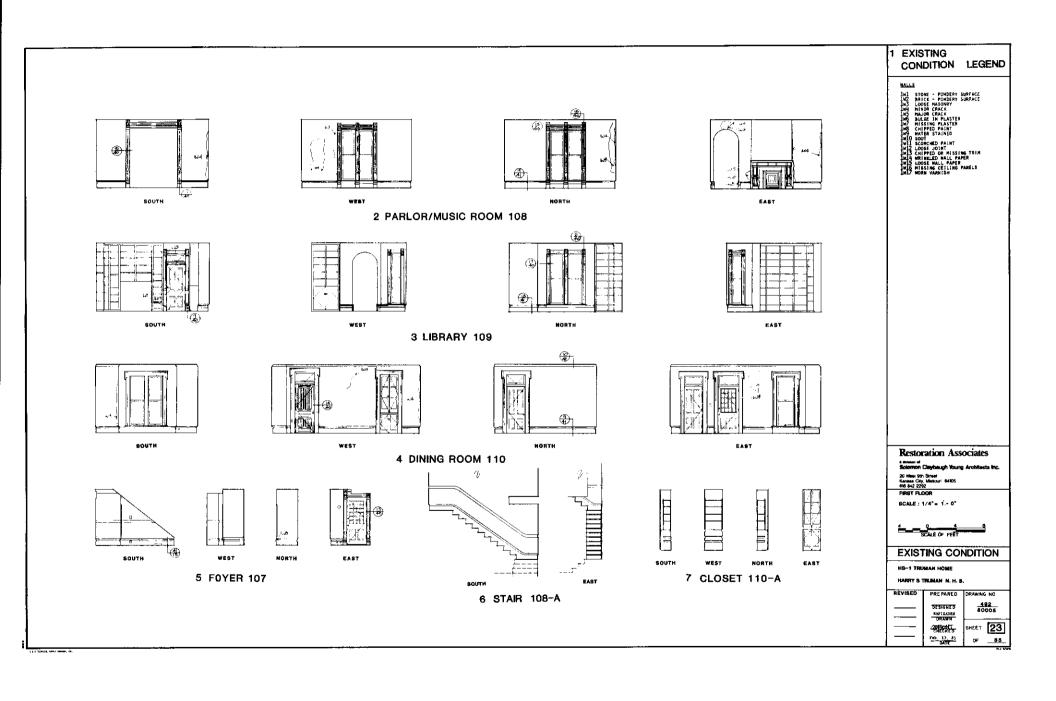


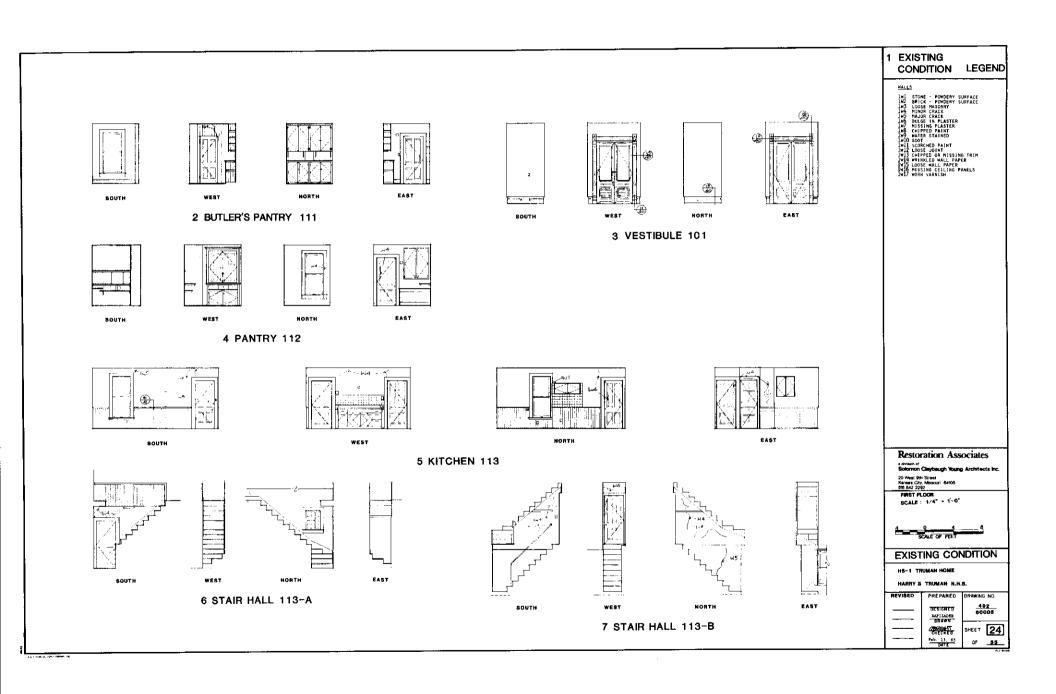


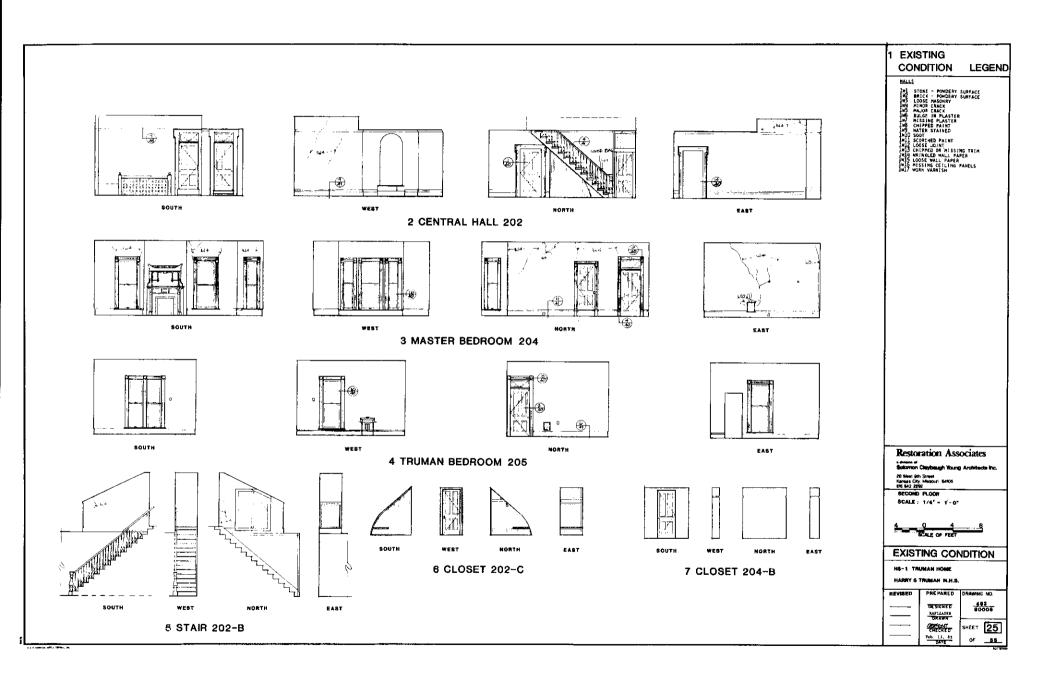


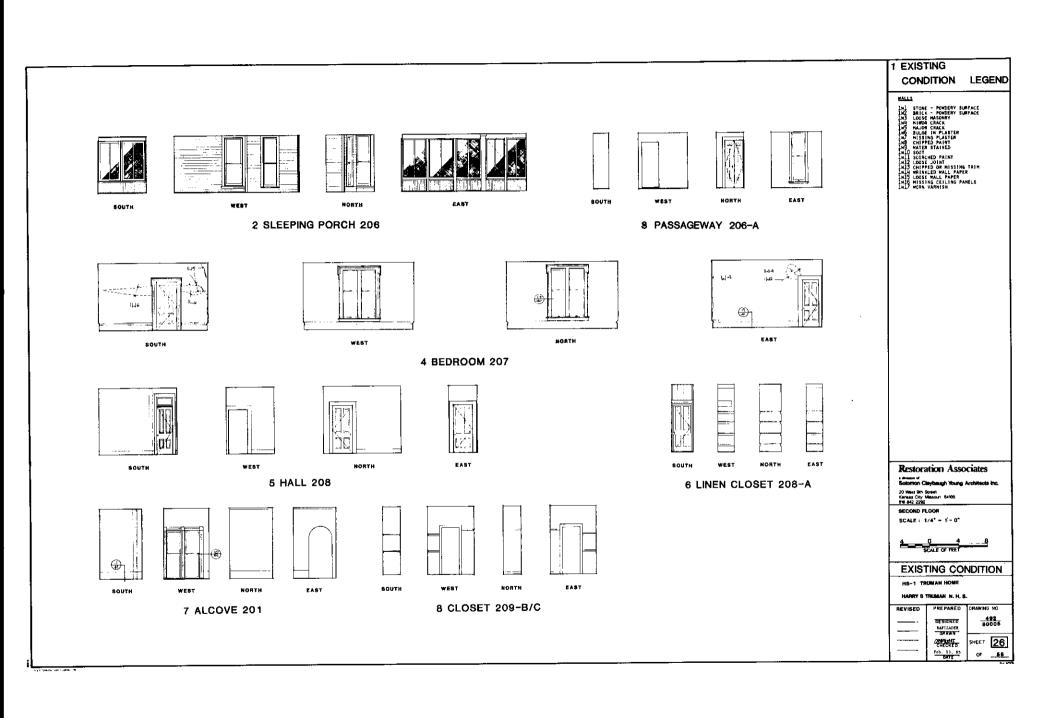


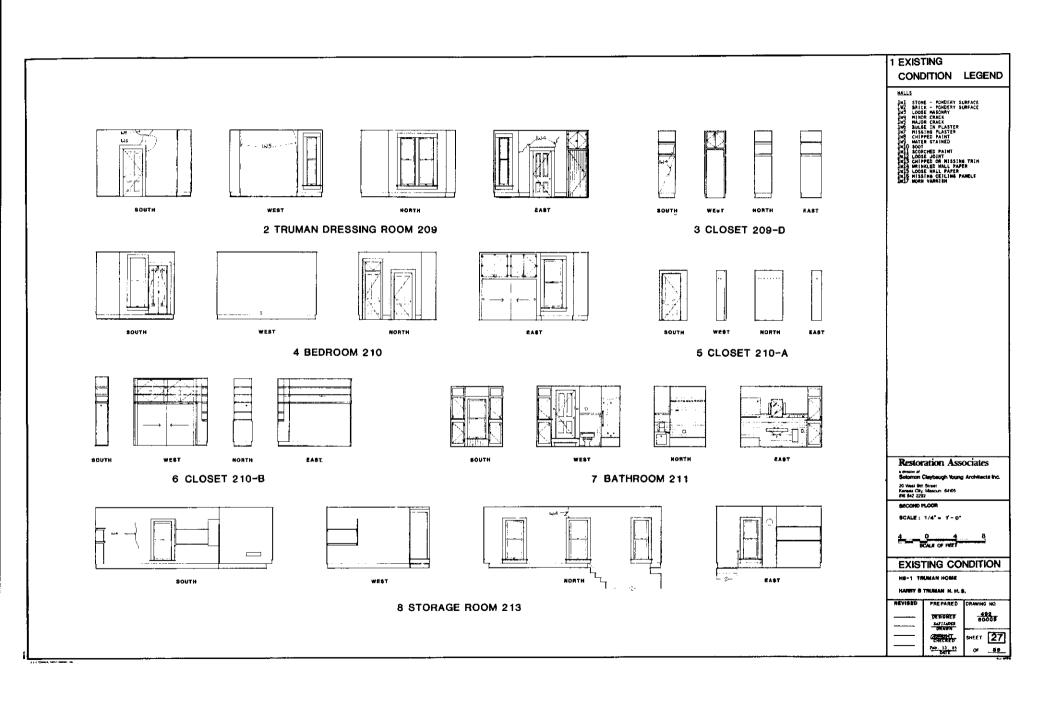


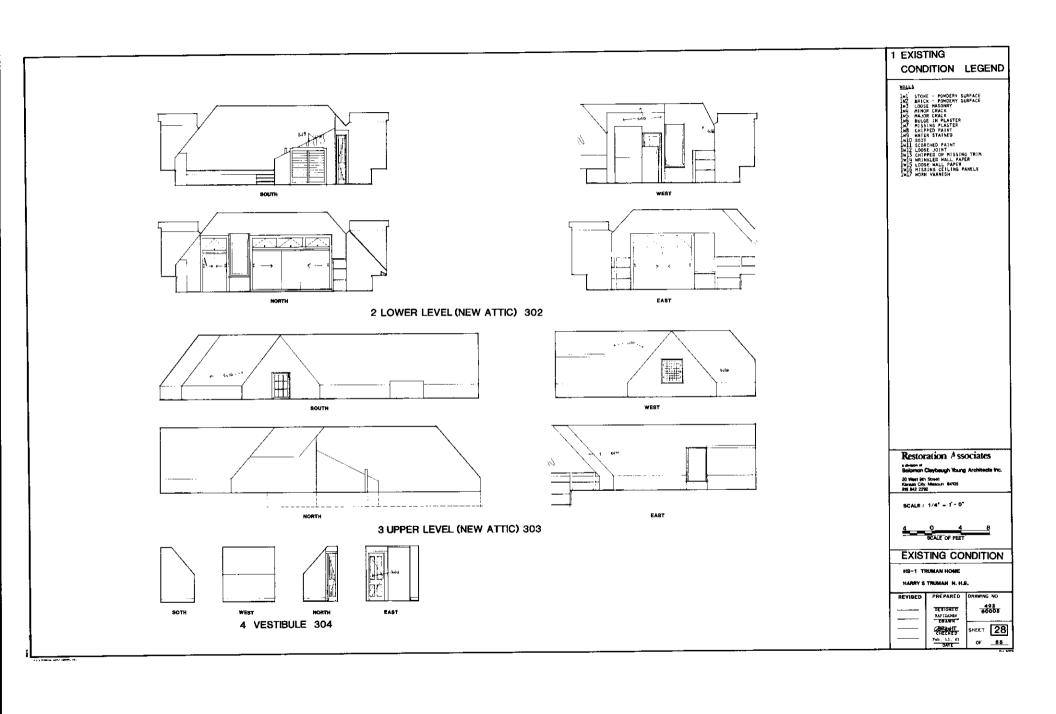


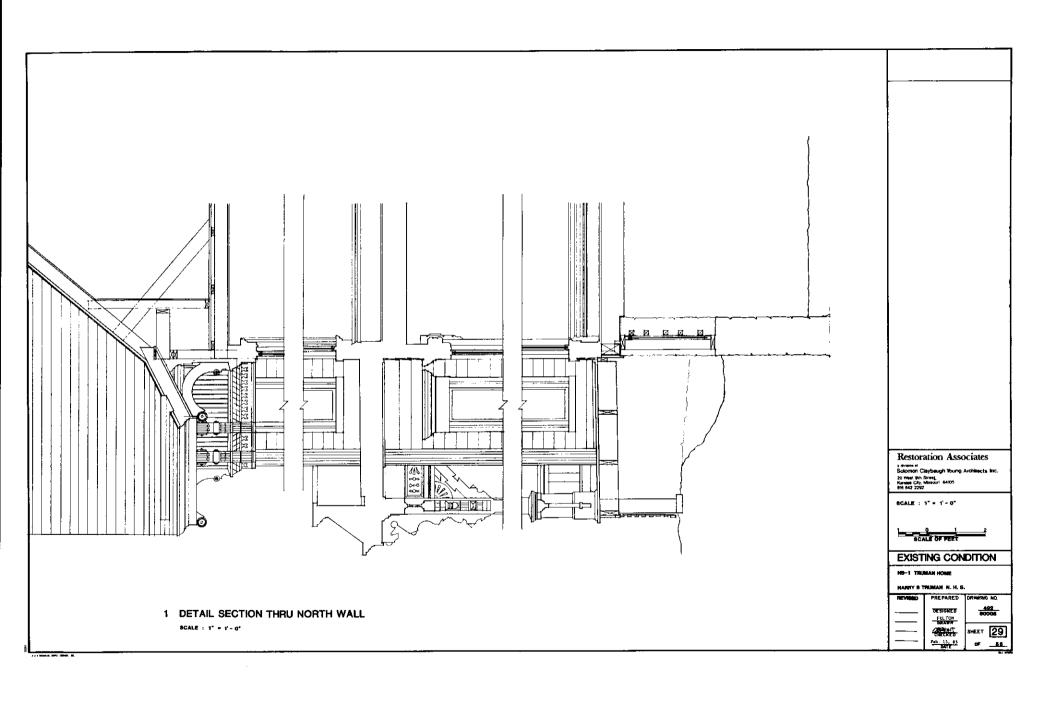


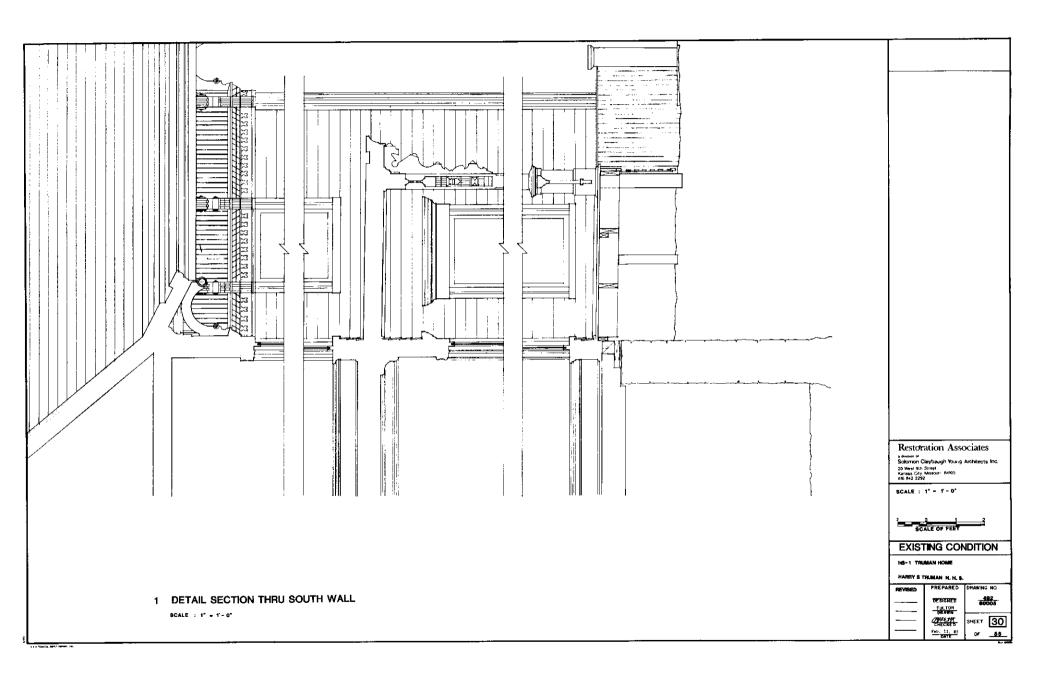


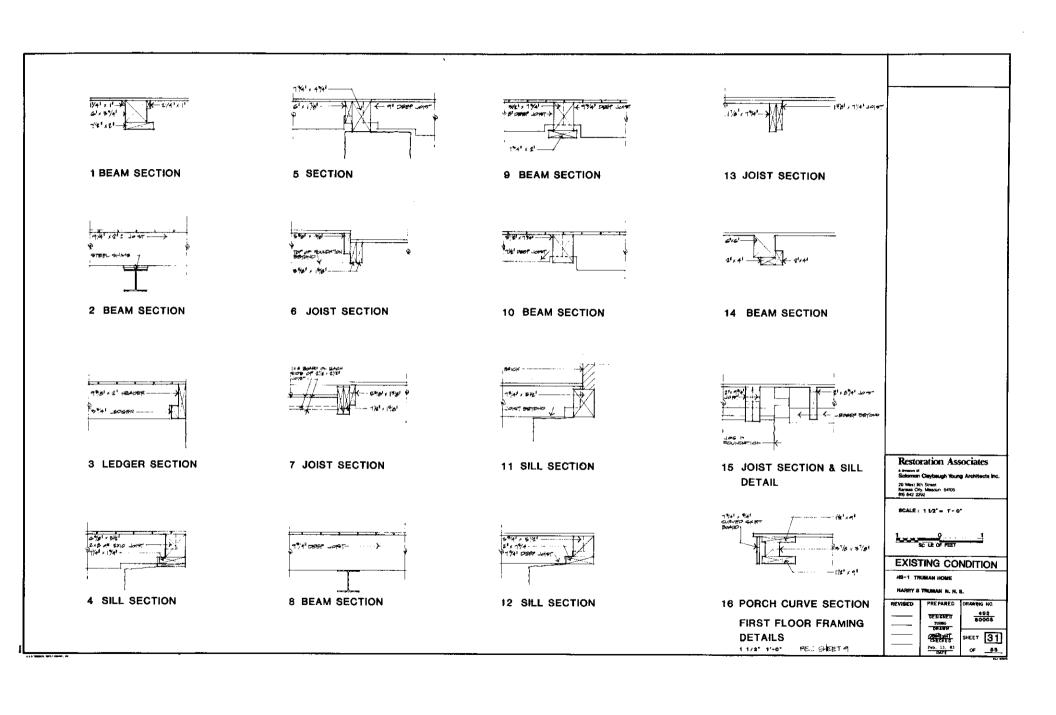


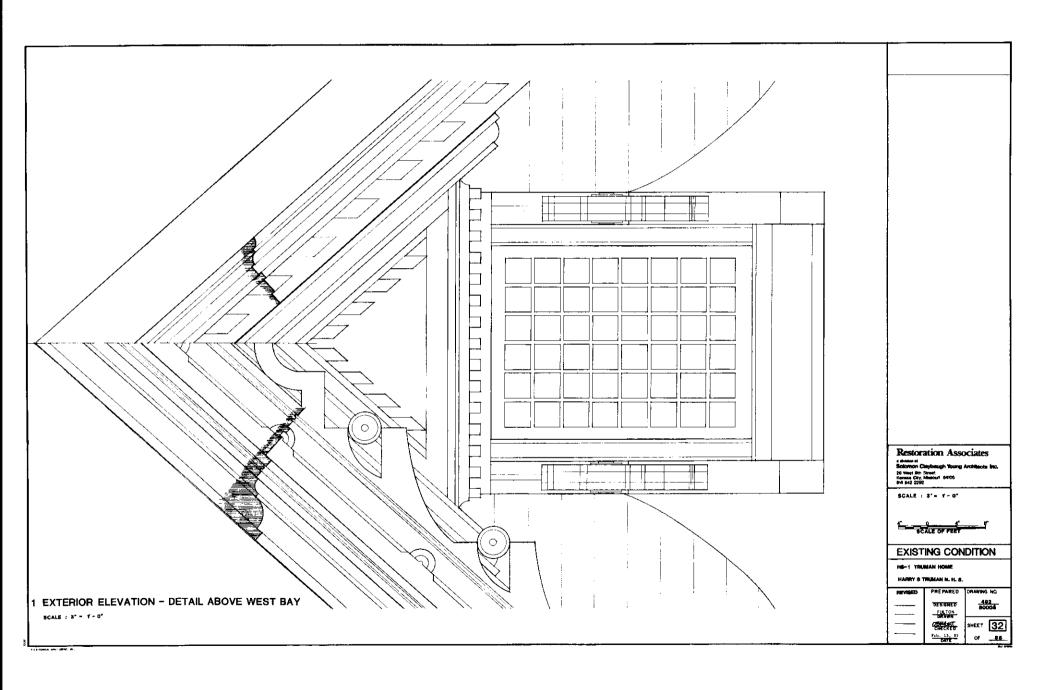


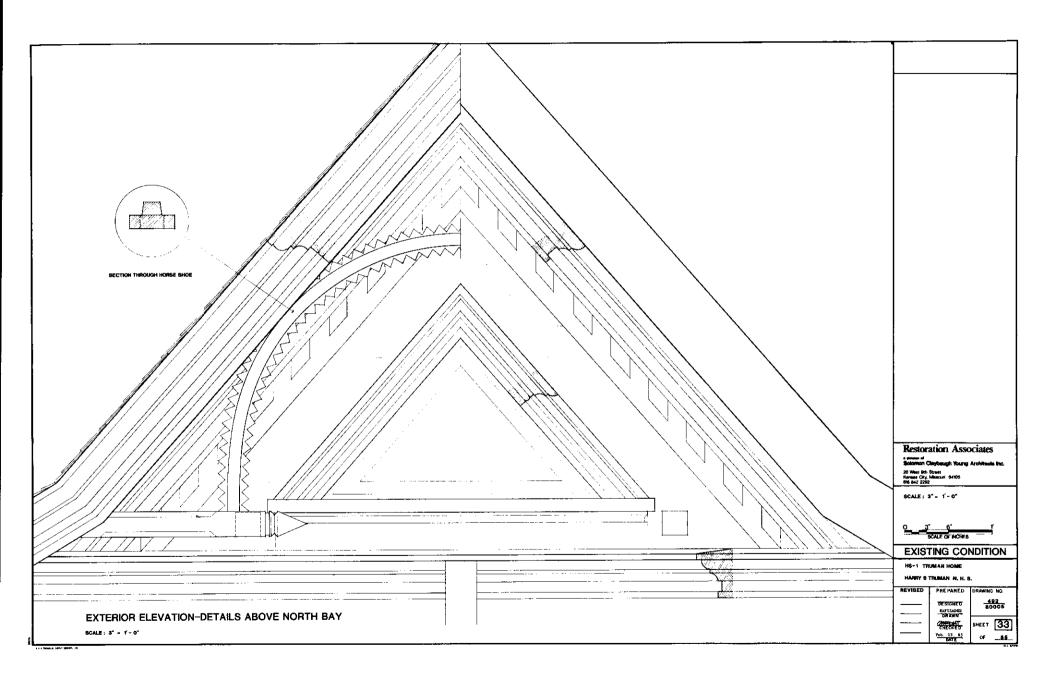


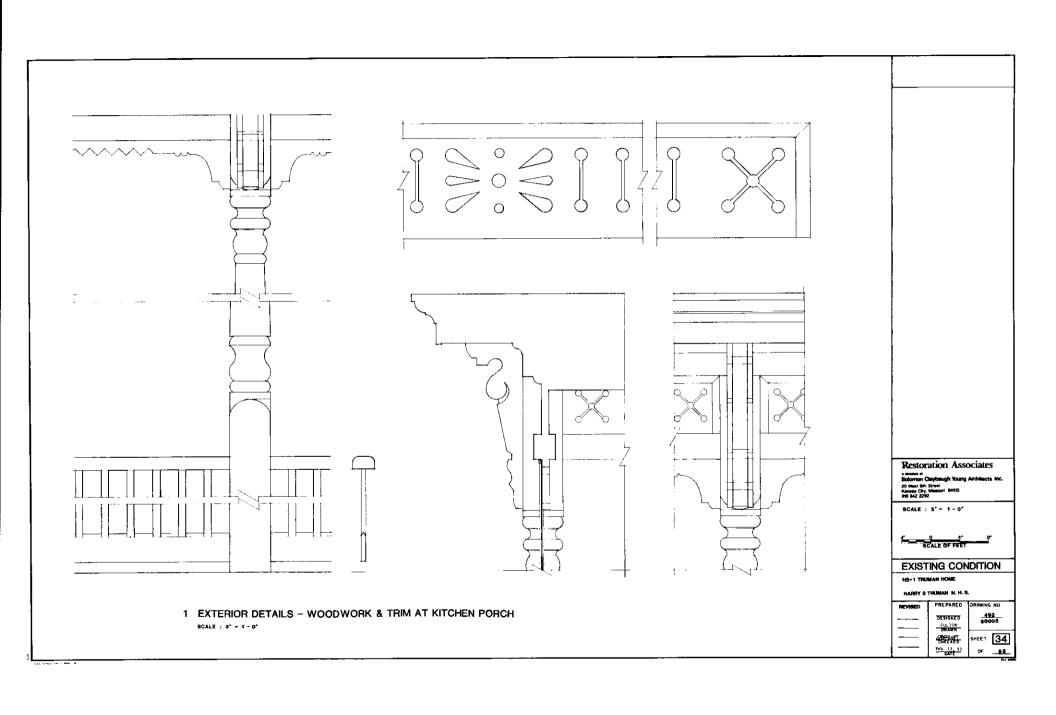


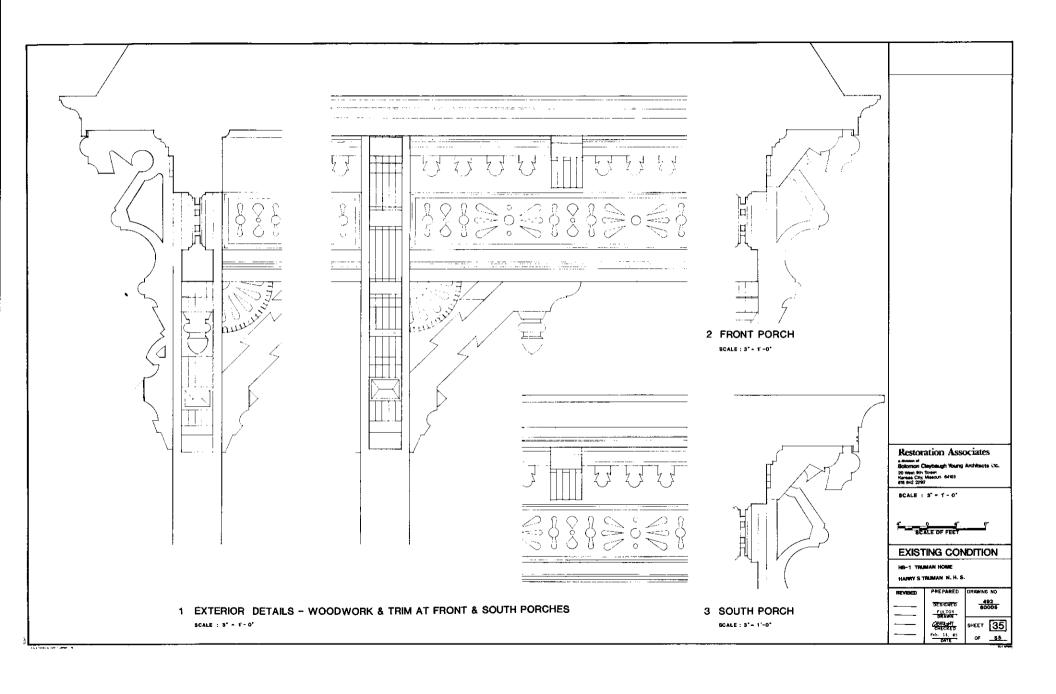


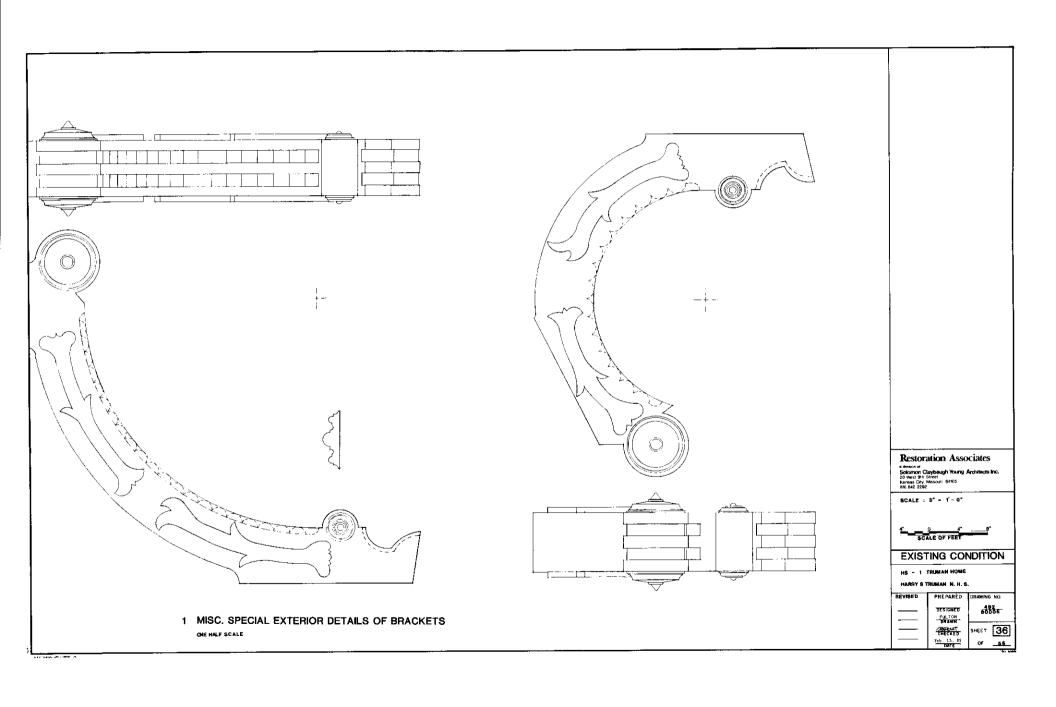


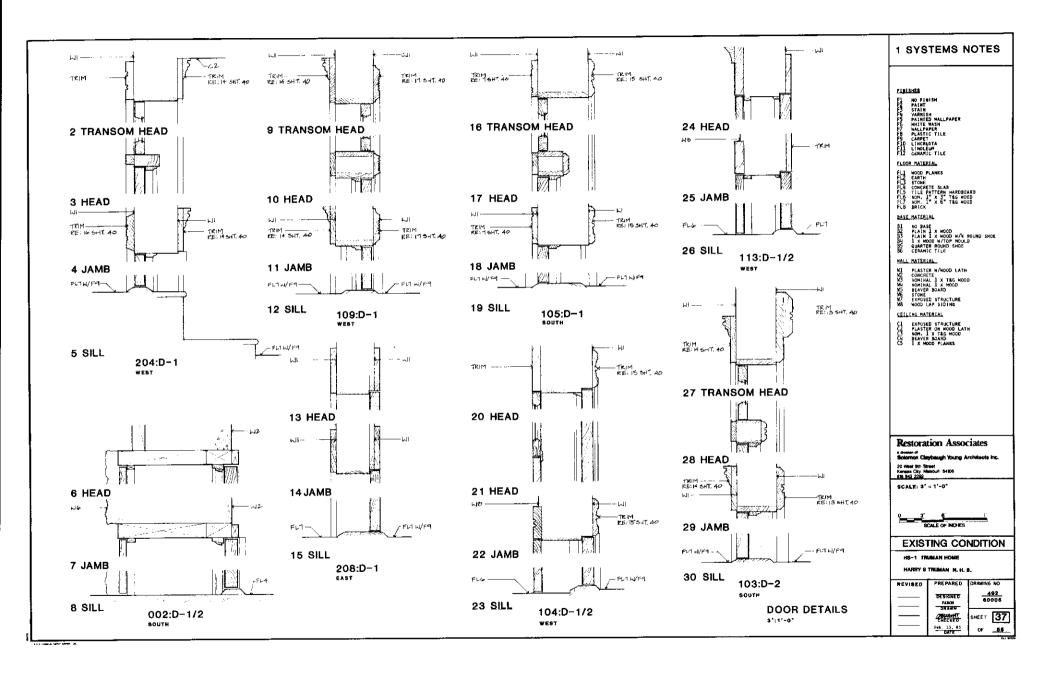


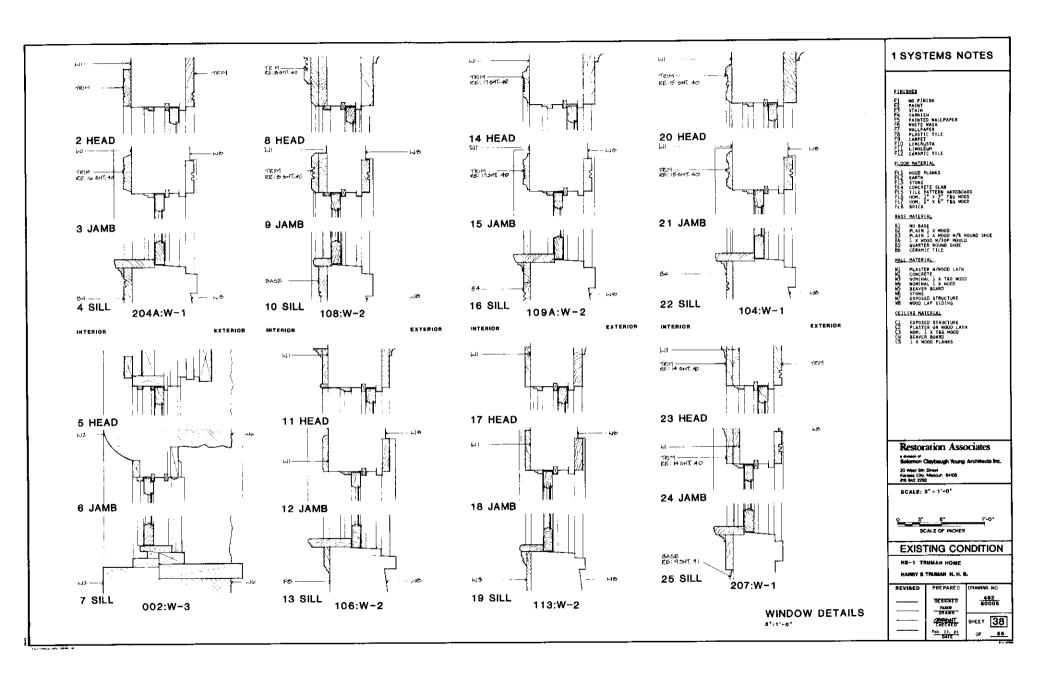


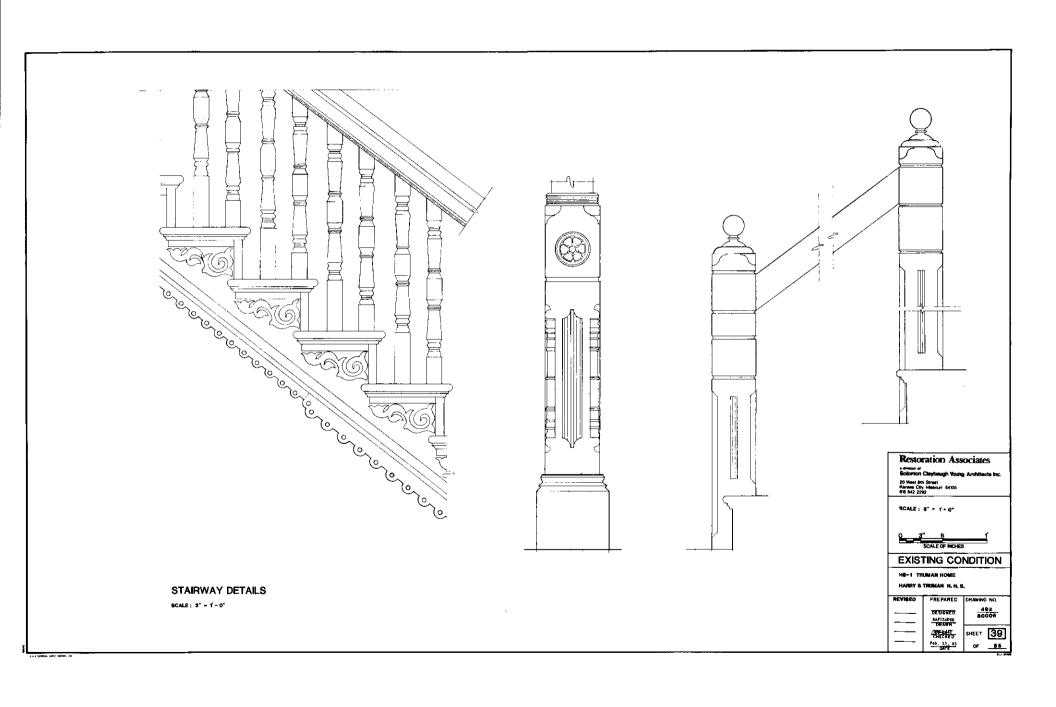


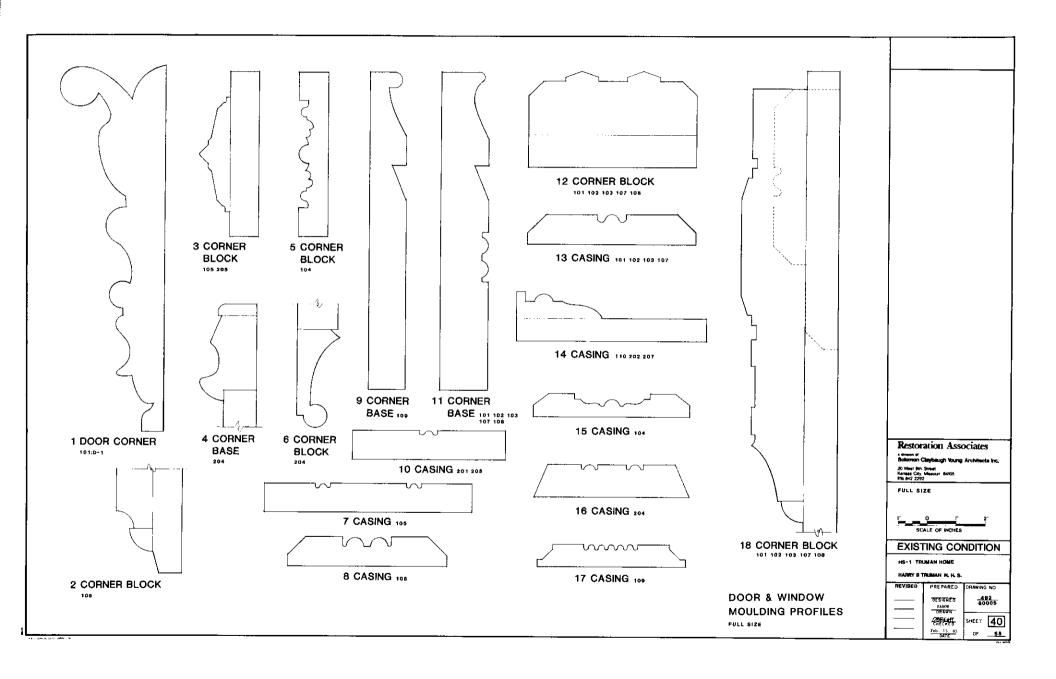


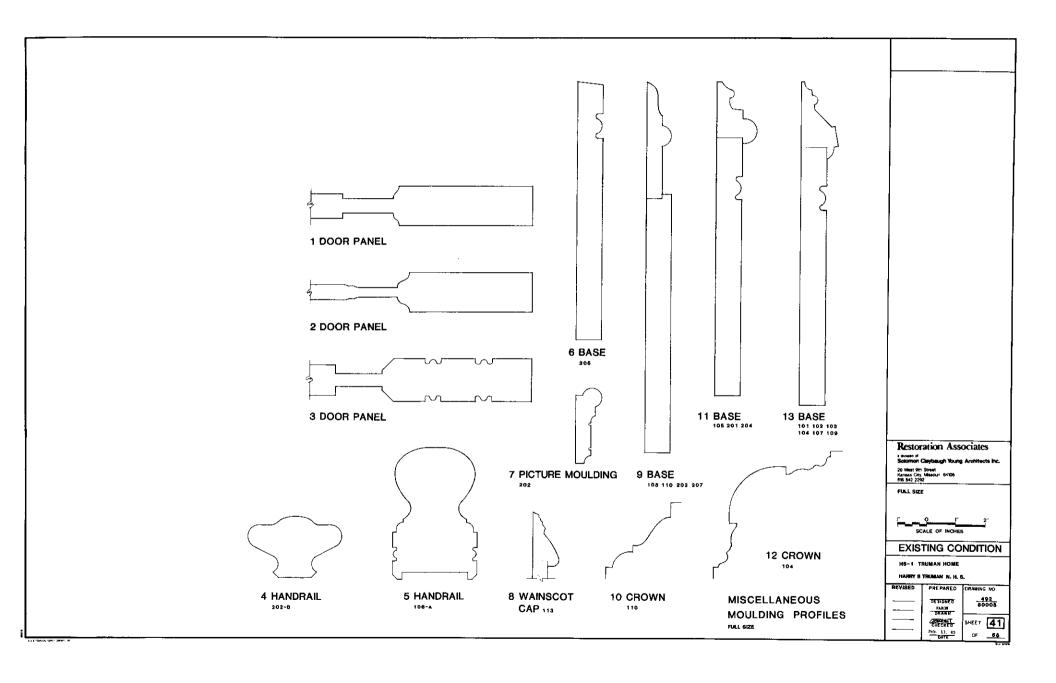












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t	EUTLERS FANT	10-0 10-0 4 6 5-4 6-4 6-9 5-4 1-7 89	1711	2011	5.7	1 55	F.5-			31.	2 M3	5 F7		34.0	~13	142	53.€	MI	-1 20	9.3	42-	FZ		C3 NOM.	TER ON MOOD LAT 1 x T&G WOOD ER BOARD HOOD PLANKS	
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t	STAIR HALL	2 1 200	F-1 1	F Z -	24	.5 32	· F	1 .1.	6.7	50.	2	1	<u> </u>		انبا	Fi	2.5.5	WI.	2-	41				_		
T	STA " HALL		PLI	P.J.	J. 49.		1		P2-	88		1=	T		ایہ	F2	51.2				<u></u>			-		
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Ļ	CENTRAL MALL	20-3 20-6 11-5/4.	1 1	F-3	1.25	5 64	11.4	IL4	F1	146.	5 WI	F1/12	4	247	2الما/الم	5F7/F4 [1	[H-4:7]	ع الم	y-2 12	56-1	12 12	P.L.		(N) NE		
ŀ	STAIR CLOSE"	10.3 20.6 11.3/4. 10.8 3.0 1.5 3.4 3.0 6-1	计汽井	F2	52. D.	J 35	7.4	14.15	F1	20.		+=		1	Mi	FZ	21.5	10	24 1 9	5.41	64	* Z-		J 'N' NE	~	
t	HAD THE DILL OF IT	1.1.2 1 2 11 110-1		, ,	2.5	3 P.4	1 80	1,07	2.7	129	2 WI	F-1		11	ر (ام	1 PT		иis	F1 10	14	4/02	F 2		コ		
ŀ	WINDOW BAY	5.5' 6' 1 10-4	7 71.3	P 1	50. 3		FZ.		F-1 F-2-	20. 25.	الما ا	F1 F2	 -	1.0	الد	F7 F2	20.0	MI IM		d	C/2	F5/F2		Dactor	ration Asse	ociat
Ī	PUMAN BEORM.	-5'-II" 4'-I " 0'-G	FEL	19	30	- 154	17.2		PA	163	त स्या	127		1500	اند	11		IIII	F-1 11	15°C	12	F2.		- NESLOR	anon Ass	ocian
1	SLEEPING PORCH PASSAGE WINY	11-4 111 91 11 41 20 41 12 41 11 11	F00	£12-	,17°.	シ BI		1	-	15.1	· —	F1	++	. 380 2		F1	80		= = = = = = = = = = = = = = = = = = = =	6.1	63	F-2	-	Solomon (Claybaugh Young	g Archite
Ť	BERROOM	5-4, 12, 2, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,	P P Let	F-4	23.	3		Mi	777	105	5 121	F1		00.9	411	F-7	10.6	الہ	F3 14	19.2	67	= 2		20 West 9th Kansas City	Street Missouri 64105	
l	CLOSET	1 9 2 6 1 1	FL1	1.2		B		1 10 10 1	FS1	4.		F F Z		5.0	pa] &	F 2-	14 . <i>a</i>	iJ4 Iui		A.0	62-	F2-		516 842 229X	2	
	HALL-	20 2 9 4		74	46. 15.4			2.4	F2-	6.	1 1	F2		30 0 21.4	أأتا	F.Z.	20.5	h.l [F2. Z	4	62	F2		コ		
ľ	TRUMAN DE RM.	1 5 2 6 7 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1921	£4	11億.	€ 38	P121	NJ.	F-1	45.	3 WI	F-1		88.3	الہ	F1	465	الہ	-1 E	569	4/62	F2		4		
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Γ	BEDRADM CLOSE [10 8 15 0 9 4 4 0 5 9 4	PLI	F2	13°1 4.9		5 P2	1.14	151 -	54. (C.	6 시	F1		121.1		F1	4. E. C.		87	2.4	62.	F2.	1	\dashv		
t	CLOSET	2.6 9.4 4.4	F-1	1.2-	11.4	9.3	5 82	hJI	172	30.0	- T	FZ		4.2	иΠ	F-2	25.2	· wi	-2 -	75.0	22	F-2-	 	EVIC	TING CO	יורואל
t	BATHROOM	1-01 4.51 8.5	FL1	274	2. 15.	1 64	0 P12	[LJ]	64/6 P	7.4	7 MI	1/012 101	4	459	pul.	P1/: 12	50.4 .41.3	ا الم	7/8/2 1.	(S.E)	C2	F1 F5		- EAIO		וטויי
Ŧ	STORAGE ZM.	M-5 14-3 5-6	F F L T	Fr.2	7.5		F2	+~"	F-1		- I KJ	I Pro-L		91.1	MI	Fr.:	.41.2	+	- 1 16	7.5	v.			HS-1 Π	THUMAN HOME	
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Ŧ	UPPER LEVEL VESTIBULE	49 6 15 5 9 6 1 3 4 1 1 1	1125	F.	530	(B)	5 F3	1,15	F1		, М; ПМ «			275 61.6	hi 5	81	215	AD AL	F1 2		400			→ — '	DESIGNED PARCE	्री बर्त
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DESCRIPTION	MANIFACTURER	MUCEL NUMBER	TECHNICAL DATA	LOCALIONS	REMARKS
HOUSE GAS FURNACE	luDéPéuDi41 STOVE & PURNACE Co.	kune	2 GAS BURNERS, MODEL 1135, EA, # 135,000BTU/HR (HPUT LAU-A-L5 BLOMEN CC., DAYTON 1/3 HP BLOWEN MOTOR NITH V-SELT # 125°X1" TUROWAMAY FILTEKS.	FURGACE ROOM 004	
DOMESTIC HOT WATER HEATER	A.D. SMITH PERMAGLASS HYDRASTÉEL	PGO-40	50,000 BTU/HR IMPUT 40 GALLON STORAGE TANK, 42 GPH RECOVERY 8100 RISE 4*6 FLUE VENT.	003	VERTICAL TANK
ATTIC VELTIFATION FAL	HUNTER ZEPHER COOLINS UNIT	A-48	1/2 HP-18,000 C.F.M.	NEW ATTIC	
GAS HEATER	g1PaY	250-BS	HEATING CAPACLIY 25,060 BIL/HR INPUT 4"0 FLUE VENT	KITUHEL 115	-
GAS HANGE	HARDWICK	NO IDENTI- FICATION TAG	4 всинея	ALTCHER 113	
GAS RANGE	DETROIT MICHIGAN STOVE CO.	A6647CVGXJ	-	LAUNDRY RGOM 002	GAS VALVE ON BACKSIDE OF RANGE
WINDOW AIR O#1401TIGHUD TUND	GENERAL ELECTRIC THINLINE	AGJE810AAXTL	COOLING CAPACITY 10,000 BTU/HR 12.0 AMPS-115 VOLT	GATES BEDROOM 105	
MINDUM AIR- CONDITIONING UNIT	FEEDERS	ACL18E/O	CCOLING CAPACITY 18,000 BTU/HR 13.7 AMPS, 208V 2810 WATTS.	KITCHEN 113	
GARBAGE DISPOSAL	SEARS ROEBUCK & CO.	No. 1/5	6.5 AMPS,-115v.	KITCHEN 113	-
WASHER	SLANS RCEBUCK RCG.	Кеннове 700	1/3 HP MOTOR	LAUNDRY ROGM 002	-

DESCRIPTION	MANUFACTURER	MODEL Number	TECHNICAL DATA	LOCATIONS	REMARKS
DRYER	WHIRLPOOL	LXE5500A0	1/3 не моток	LAUNDRY ROOM 002	ELECTRIC
KITCHEN UNIT	AMERICAN STANDARD	SINK P-6535 FITTINGS H-4113-1	-	KITCHEN 113	-
WATER CLOSET	KOHLER	WELL WORTH K-3705	-	007	COLOR-WHITE
BATH TUB	CRAME	THE 2-80 FITTINGS 9-20	_	BATHROOM 106	COLOR-GREEM
LAVATORY	CRANE	CRITERION LAVATORY 1-80 FITTINGS 8-1		GATES BATHROOM 106	COLOR-GREEN
WATER CLOSET	CRANE	DREXAL 3-122	-	GATES BATHROOM 106	COLOR-GRÉEN
LAVATORY	CRANE	YORKSHIRE LAVATORY 1-29! FITTINGS 8-12:	-	TRUMAN BEDROOM 205	COLOR-GREEN
BATH TUB	AMERICAN STANDARD	TUB-P-2187 FITTINGS-N1016 M1700-16	1	BATHROOM 211	COLOR-BLUE
LAVATORY	AMERICAN STANDARD	LAVATORY-F-90 FITTINGS N210	-	BATHROOM 211	COLOR-BLUE
WATER CLOSET	AMERICAN STANDARD	F-2000	-	BATHROOM 211	MASTER ONE PIECE

1 MECHANICAL SCHEDULE

